

THE IRON AGE

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New Plant Puddles Iron Mechanically

Lebanon Valley Iron & Steel Co., Lebanon, Pa.,
Adopts Modern Method of Producing Muck Bar
—Great Savings in Labor Costs Expected

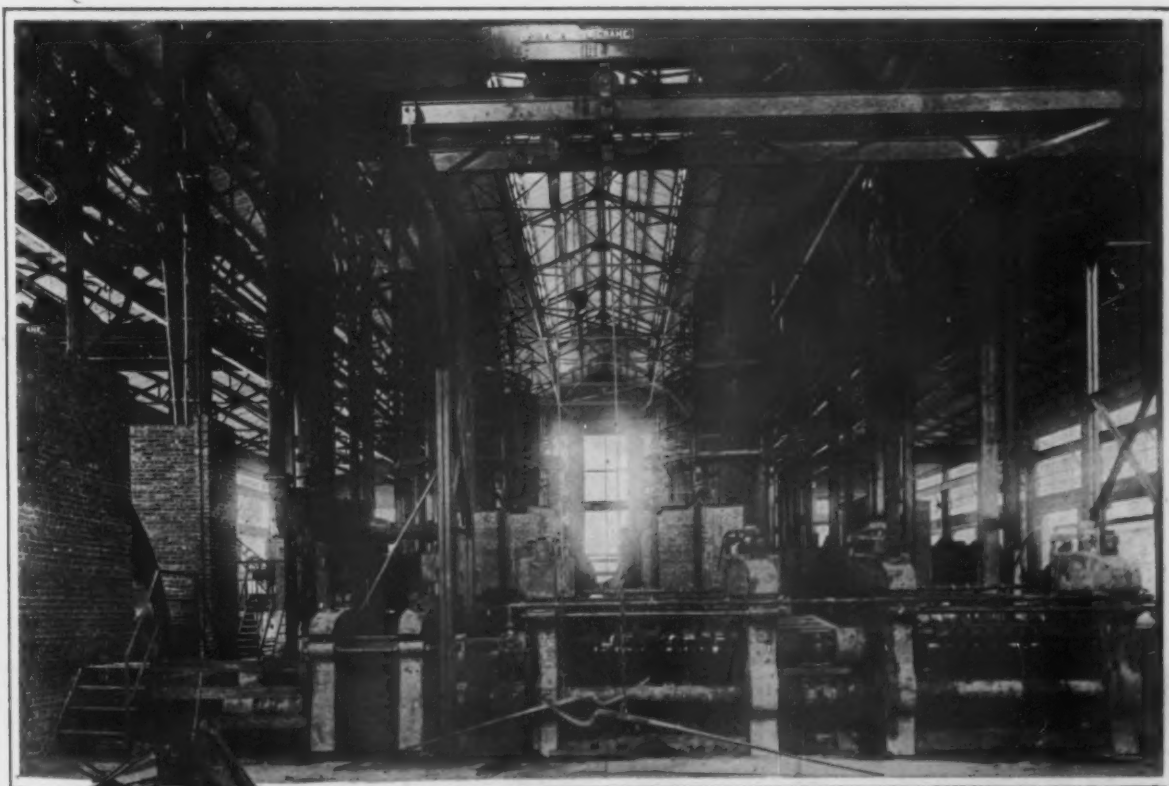
MORE than six years ago the first mechanical puddling furnaces in the United States were put into operation by the Glasgow Iron Co., Pottstown, Pa.; the Reading Iron Co., Reading, Pa., and the Sellers Mfg. Co., Chicago. Those in the Glasgow and Reading plants were the invention of James P. Roe, general superintendent of the Glasgow works. The Sellers company installed two, which later were rebuilt, and four more were added, having been designed jointly by J. M. Sellers, now president of the company, and D. H. Lentz, an employee. Not long after these installations the Highland Iron & Steel Co., Terre Haute, Ind., adopted for use several rotary puddling furnaces, which were the invention of Walter C. Ely, an officer of the company. Although the question of mechanical puddling has since received much attention both at home and abroad, due consideration having been given to its labor-saving advantages, no real progress appears to have been made in general adoption by commercial plants. The first important step in this direction has been taken by the Lebanon Valley Iron & Steel Co., Lebanon, Pa., which has built and equipped a new mill at a cost of \$750,000. The furnaces installed are of the

Ely pattern. The decision to build the plant was made only after careful study by officers and engineers of the Lebanon company extending over a period of years.

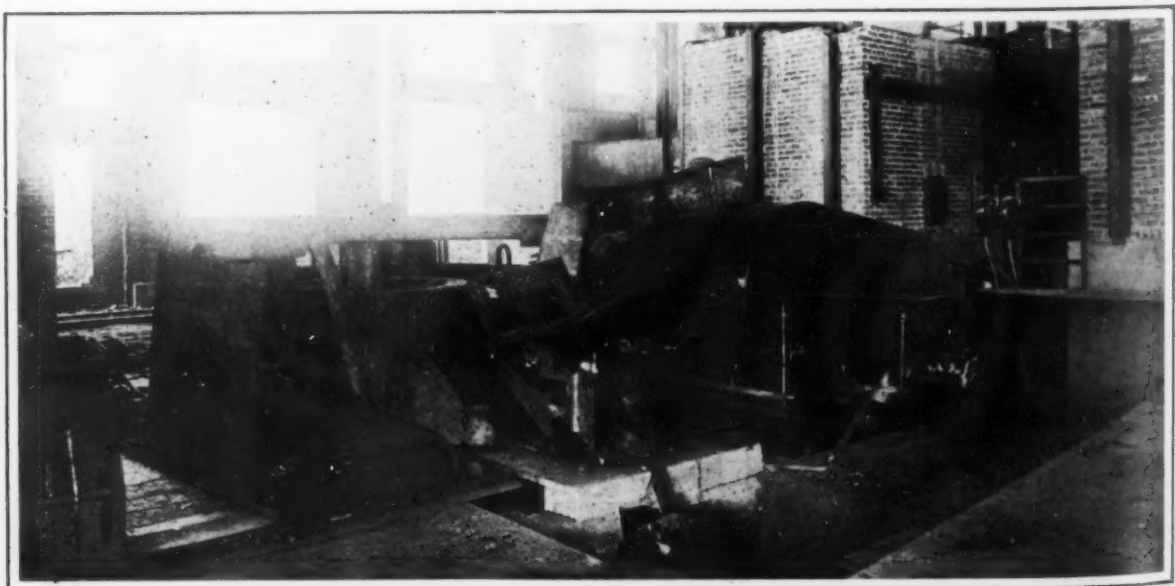
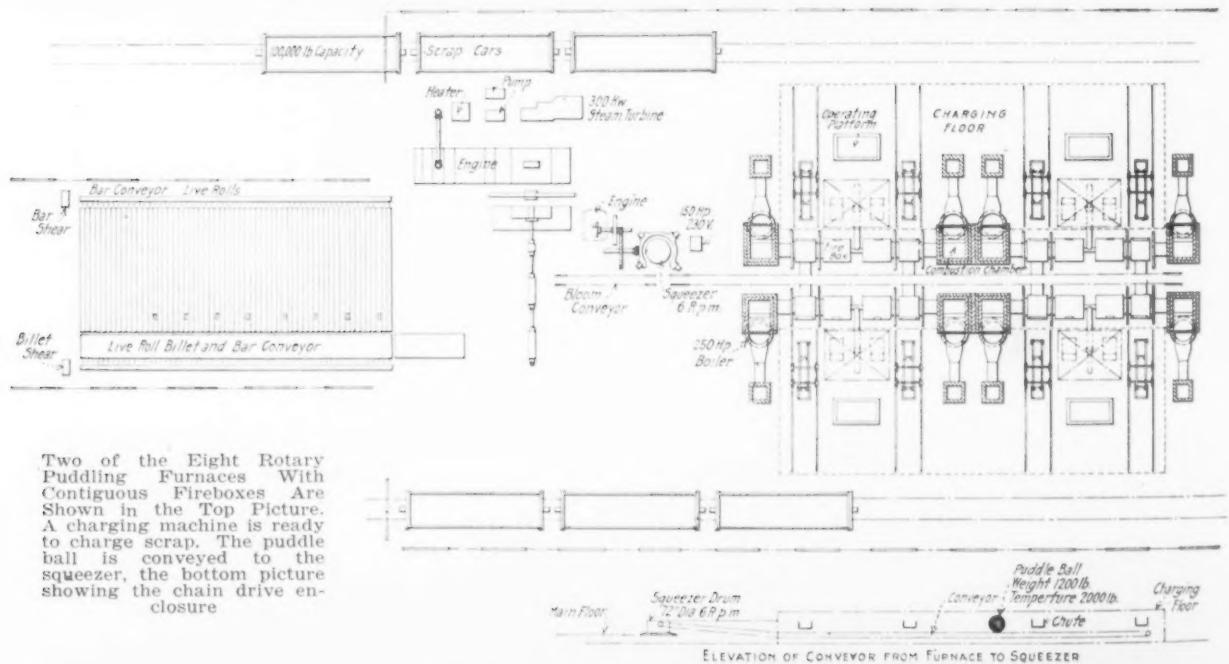
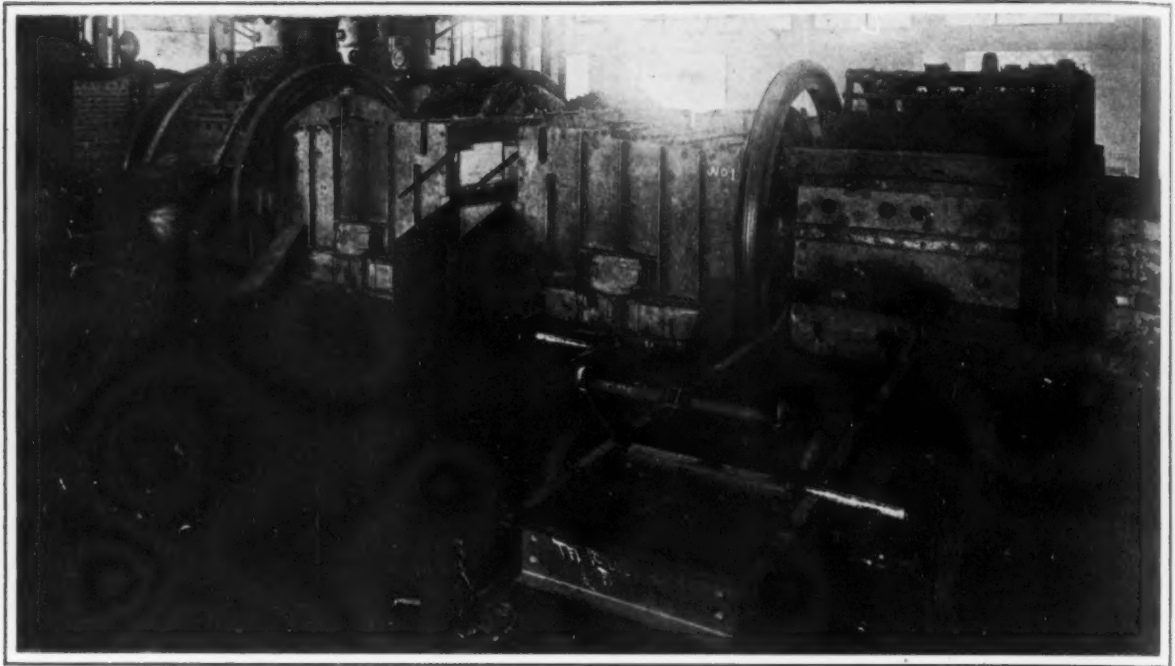
While the Lebanon plant embodies practically all of the basic principles which were in use at the plant of the Highland Iron & Steel Co., it is an improvement over the Terre Haute plant in that some of the mistakes of the latter have been avoided. The Lebanon plant was designed by the company's own engineers, assisted by Mr. Ely, the inventor of the furnace.

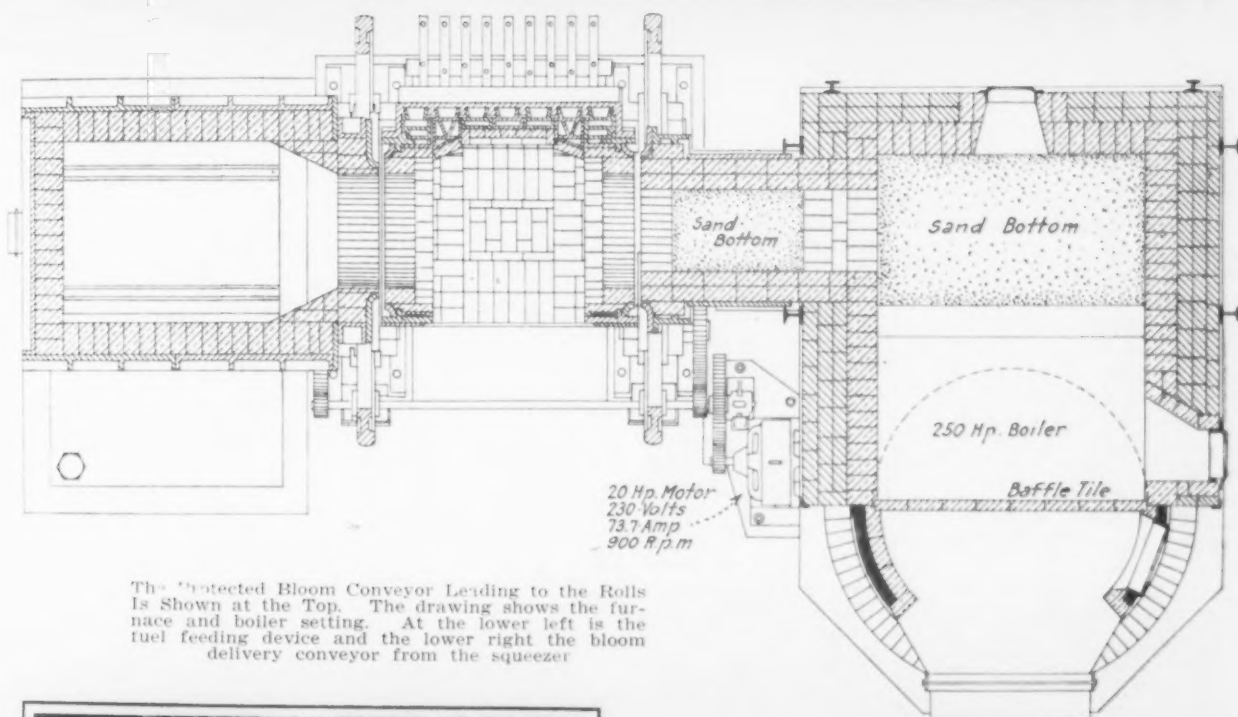
Among the advantages claimed for mechanical puddling is the great saving of labor, which is reflected in reduced production cost. The Lebanon company expects that the cost per ton of scrap bar with the new process will not exceed 20 per cent of the cost by the former method so far as labor is concerned, and there will also be a saving on raw material, as no pig iron will be used.

In the older method two puddlers and two helpers are required for each furnace, and the rate of pay at the Lebanon plant has been \$10.75 per ton. All of this skilled labor is eliminated by the new process. The only labor cost at the furnace is for charging of coal

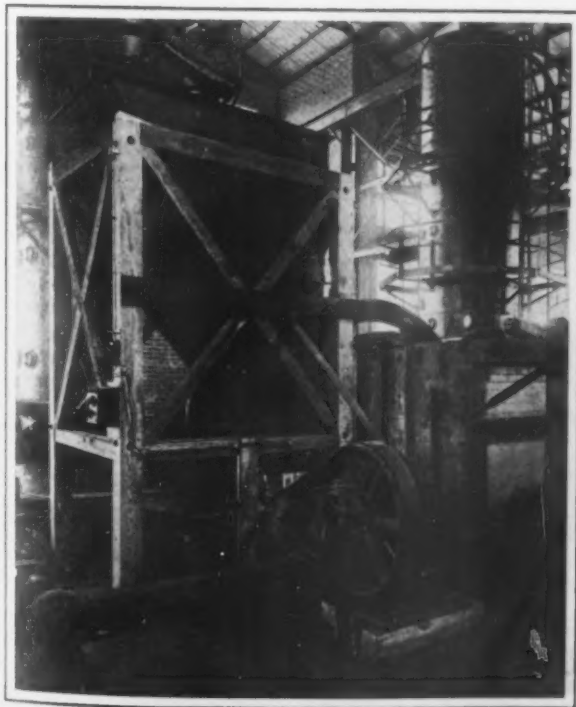


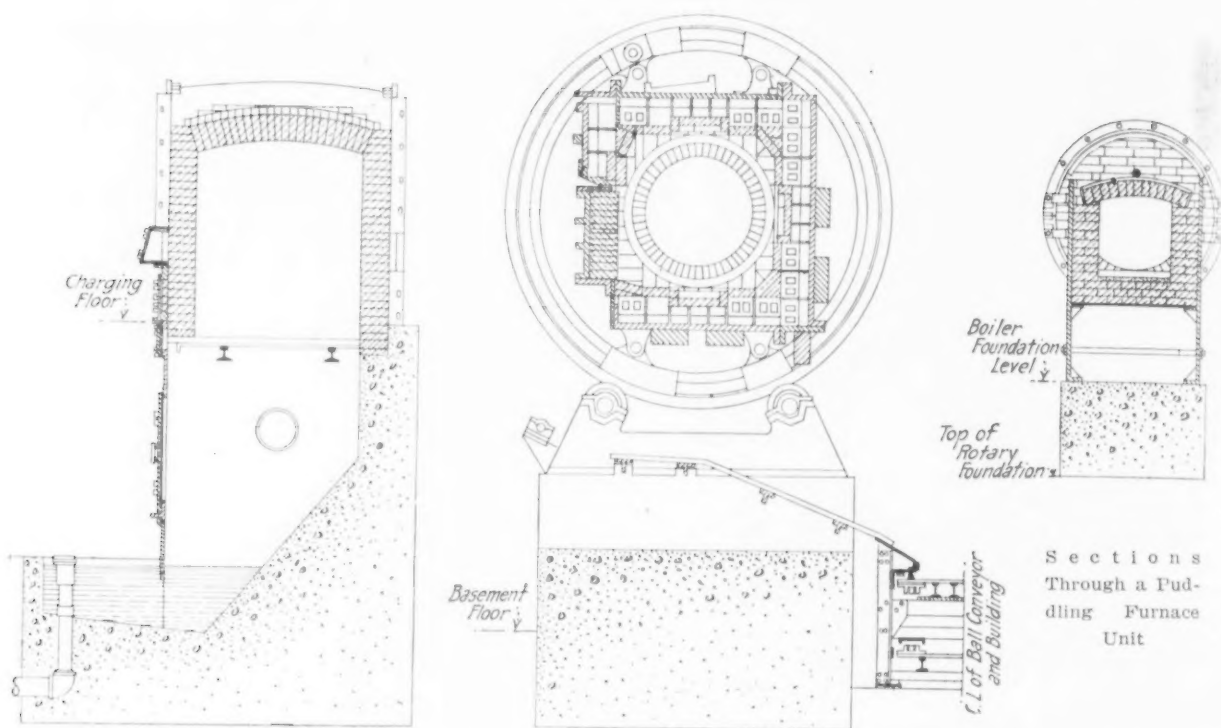
In the Background are Two Rows of Four Puddling Furnaces Facing Each Other and at the Left, Immediately Behind the Two Sets of Three-high Roughing Rolls in the Foreground, is the Squeezer. The 250-hp. vertical waste heat boilers may be noted





The Protected Bloom Conveyor Leading to the Rolls Is Shown at the Top. The drawing shows the furnace and boiler setting. At the lower left is the fuel feeding device and the lower right the bloom delivery conveyor from the squeezer





and scrap, 12 men doing all of this work for the eight furnaces.

The whole plant, with a capacity for 160 tons of iron every 12 hr., will be manned by not more than 20 workers. In addition to the 12 men at the furnaces, one man is required to operate the puddle ball and bloom conveyors; another operates the engines, pumps, etc.; still another operates the dragout and transfer on the cooling beds, and there are two men to operate the shears. Three crane operators and two common laborers complete the roster of workmen in this mill.

The building especially constructed for this work is of brick and steel with cement tile roofing. The main section is 240 ft. long and 147½ ft. wide. An extension on one end, 20 by 54 ft., is for storage of coal, while the cooling beds and the billet and bar shears occupy the extension at the other end, 54 by 120 ft. A

standard gage railroad track runs through the building at each side, there being sufficient space on each track for three cars of 100,000 lb. capacity. Scrap iron is unloaded from these cars onto the charging floors by means of magnets and dumped into charging machines, which run on rails to the doors of the puddle chambers.

There are two charging floors, each 40 by 100 ft., each floor serving four furnaces. Accompanying drawings show the plan of the complete furnaces, including fire box and puddle chamber. The fire box is 53 in. wide and 63 in. long, while the puddle chamber is 6½ ft. rectangular. Through an opening between the fire box and the puddle chamber a flame approximating 2900 deg. Fahr. is blown into the puddle chamber. The blast is produced by four No. 9 Sturtevant blowers driven by 40-hp. motors. One blow furnishes the blast for two furnaces and the blowers are so arranged that one furnace can be operated without regard to the other. The blast is forced through a grate underneath the fire box into the puddle chamber. One burner serves each furnace.

The puddle chamber operates on two carrying rings, which are 10 ft. 3¼ in. outside diameter, these rings traveling in friction rollers of 14 in. diameter. The door of the puddle chamber, through which the puddle ball is dropped upon a conveyor, is 2 ft. 6 in. by 3 ft. 6 in. This door is also used for charging the scrap. Another and smaller aperture is provided for discharging the slag. The puddle chamber is rotated as the blast is applied. The control is electrical and one operator handles all eight furnaces.

It requires 12 min. for each heat and the puddle ball produced weighs approximately 750 lb. It is expected that puddle ball running up to 1000 or 1200 lb. can be produced in these furnaces and the time may be reduced when operations become better systematized. Output of the eight furnaces is expected to average 160 tons every 12 hr. The consumption of scrap will be about 10 per cent greater than the tonnage of blooms produced.

Later each furnace will be served with powdered coal, which will be blown into the furnaces by electric-driven pressure blowers. A hopper will be placed in front of each furnace, into which powdered coal will be dumped, to be blown out from the bottom into the fire box. This feature is expected to be greatly instrumental in cutting down labor costs.

Gases from the furnaces pass into waste heat boilers, eight of which have been installed, and this waste heat is utilized to generate electric power by means of a 300-kw. Westinghouse turbine. Waste heat also is used to drive a 30 x 60-in. Corliss-Allis mill engine and



The Cooling Bed with a Shear at End of Each Conveyor

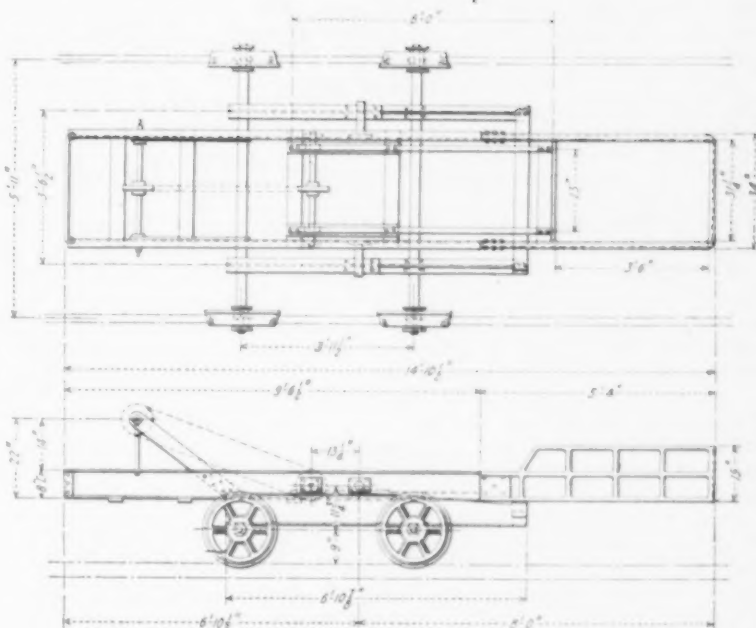
a 24 x 27-in. squeezer engine. Two more turbines will eventually be installed as there will be sufficient waste heat to operate all of them and electrify the entire plant, which includes several other mill buildings. There are eight waste heat boilers of the Wickes vertical type, each of 250 hp., and each containing 116 4-in. tubes, 21 ft. long.

When the puddle ball has been sufficiently heated it is dropped through the door of the puddle chamber upon a Link-Belt conveyor and is conveyed about 20 ft. to an all-steel squeezer. After passing through the squeezer the bloom is dropped upon another conveyor which carries it to the roughing mill. There are two sets of three-high rolls, 22 in. in diameter and 80 in. wide. One set of rolls is used for breaking down the blooms to billets and the other set for breaking down to bar sizes. The mill was built by the Lewis Foundry & Machine Co., Pittsburgh.

Included in the equipment of the plant are five Niles cranes and three E. C. M. electric magnets. Each charging floor is served by a 5-ton crane, 40 ft. span, and the furnaces are served by a 20-ton crane with 5-ton auxiliary. There is a 5-ton crane over the rolls and another over the cooling beds. The large crane can be used for removing one of the furnaces for repairs when necessary. A spare furnace will be on hand for substitution, and no production will be lost because of any breakdown.

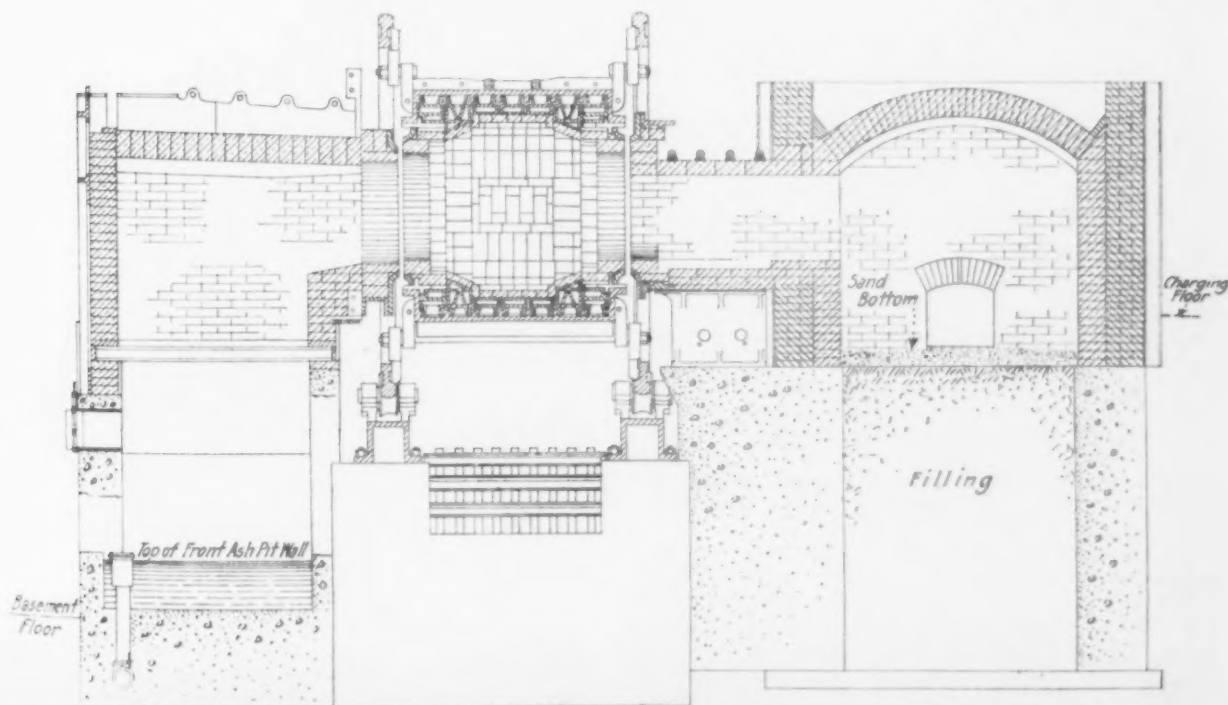
Specimens of iron produced in the new plant have shown up exceedingly well under tests. The standard for tensile strength of the American Society for Testing Materials for refined wrought-iron bars is 48,000 lb. per sq. in. and the standard for elongation in 8 in. is 22 per cent. Test bars at the Lebanon plant have shown a tensile strength varying from 50,200 to 54,200 lb. per sq. in., while the percentage of elongation in 8 in. has varied from 27 to 30. It is the expectation of the Lebanon Valley Iron & Steel Co. that it will be able to produce a better grade of iron than can be produced by the older method and at a much lower cost.

It is stated that the reason for the better quality of iron is that the material can be worked more uniformly



Car Used for Charging the Furnace

in the rotary furnaces than by the hand puddling method. Every piece of scrap which goes into the furnace is heated identically with every other piece, while in the old method the puddler can work his iron in such a manner that the inside of the bloom will be half heated while the outside will be hot, and in many cases too hot. The company has found that where steel scrap is inadvertently mixed with iron scrap in the rotary furnace the steel scrap is almost completely decarbonized. Another reason given for the superiority of mechanically puddled iron over the hand puddled iron is the fact that the furnace takes a 750 lb. charge, bringing out a very large ball, which is delivered to the squeezer and comes out a bloom 42 in. long by 9½ in. diameter. This, in turn, is worked down on the mill to a 4, 3, 2½ or 2-in. billet, thus giving the billet sufficient working so that when it goes to the finishing mill and is reheated and rolled down into the finished bar it has been sufficiently worked to give it fibre and also strength and elongation.



From the Combustion Chamber at the Left the Gases Pass Through the Puddling Furnace to the Boiler Setting at the Right

The Chicago Technical Conventions

Mining Engineers, Steel Treathers and Electrochemists Hold Fall Meetings—Two Large Exhibitions—Scientific Papers and Discussions

THREE technical conventions of importance were held in Chicago, Sept. 22 to 27. The American Institute of Mining and Metallurgical Engineers held its one hundred twentieth meeting at the Congress Hotel where the registration exceeded 750. Besides five sessions on iron and steel or related subjects there were some on mining, geology, oil, coal and other subjects. A trip to the Gary steel plant of the United States steel Corporation, scheduled for Tuesday, Sept. 23, had to be abandoned but there were other excursions to La Salle, Milwaukee and some Chicago industries.

The first annual convention and exhibition of the American Steel Treathers Society was held at the Seventh Regiment Armory. This was the surprise of the week. Besides an exhibition which in variety and character easily equalled if it did not surpass some of

those of much older organizations, there were also held simultaneously each day technical sessions at which papers of unusual merit were presented.

The American Electrochemical Society also convened at the Congress Hotel in conjunction with the mining and metallurgical engineers and also at the chemical exposition, with papers of interest to steel makers.

The fifth annual exposition of chemical industries, held at the Coliseum and the First Regiment Armory, was also a decided success as to attendance and exhibitors. Various technical and motion picture sessions were constantly going on in conjunction with both expositions.

The conventions included also those of the American Ceramic Society, the American Pulp and Paper Association and the Electric Furnace Association.

American Institute of Mining and Metallurgical Engineers

STEEL rails, gases in steel, heat treatment of steel castings and pyrometry as related to the steel industry were the prominent subjects presented and discussed by the mining and metallurgical engineers. There was also a wealth of papers on non-ferrous metallurgy and metallography as well as on coal and gas, geology, mining and industrial organization. A symposium on sulphur in coal was a feature.

Gases in Steel

Gases in steel was the most important topic presented and discussed at the joint meeting on Tuesday afternoon, Sept. 23, of the mining engineers and the electrochemists. This is the meeting which was to have been held on the steamer on the trip to Gary, Ind., but which was abandoned because of the general steel strike.

This subject was presented by J. R. Cain, United States Bureau of Standards, in a paper, "Determining Gases in Steel and the Deoxidation of Steel." It was abstracted by the author. Dr. Cain's paper contains criticisms of the work that has been done in the determination of gases in steel and also presents some suggestions which the Bureau has formulated and some of the plans of investigation it contemplates. It is claimed that all of the four or five analytical methods for gases in steel are subject to certain errors and that none of them has far reaching value when it comes to determining their actual effect on the properties of steels. The author regarded the Ledebur method as of little practical value in scientific research work, but pronounced the Allen method for nitrogen as affording good results.

Dr. Cain, in outlining the plans of the Bureau, stated that a small open-hearth furnace was to be used in making various heats under as nearly commercial conditions as possible, these heats to be deoxidized by the usual deoxidizers and the gas contents determined with the object of working out dependable analytical methods. It is also the object to devise or select certain deoxidizers which may be substituted for manganese and other deoxidizers and to study the slags produced by such deoxidizers as to their fluidity and readiness to separate from the steel.

Dr. Allerton S. Cushman in a written discussion suggested the naming of the gases in their various conditions in the steel as alpha, beta and gamma gases. Dr. John C. Unger, manager central research department, Carnegie Steel Co., Pittsburgh, said:

Those investigators who have tried to determine oxygen in steel, by reduction in hydrogen, or oxides and slags by solution methods, have been surprised to find that at

times their results showed great variations on the same samples. When one considers that oxygen and nitrogen are blown into the blast furnace and cupola and that the reaction is intensely oxidizing, then powerfully reducing, it is difficult to understand how oxygen can be found in the pig iron, especially in the presence of high percentages of such reducing agents as carbon, manganese and silicon.

Results have been published showing pig iron containing more oxygen than Bessemer steel, which is made by a rapid oxidation process. Other results show electric steels made under reducing slags have a higher oxygen content than basic open-hearth steels made by oxidizing methods. Some published results show steels of superior quality, but of higher nitrogen content than other steels containing less nitrogen. Such evidence is conflicting. Shimer and Kichline, in a paper before this institute in 1913, showed how difficult it was to prepare over-oxidized steel. Iron and many other metals absorb gases at ordinary temperatures. Much has been written of the beneficial or injurious effects of the elements purposely added or found in steel. Much is based on opinion, not on facts.

It would appear to me that accurate data on the effects of various gases on the physical and mechanical properties of steel is of equal, if not greater importance, than the development of the best methods for the determination of gases. These data can only be obtained by making steels containing large amounts of oxygen, nitrogen, hydrogen or their compounds and making a careful study of their effect on the properties of the steel. If it is shown that a certain gas or gases have particularly beneficial or deleterious effects, then the best method of determining these gases should be studied.

Dr. T. D. Yensen, Pittsburgh, characterized the paper as decidedly important because of our lack of knowledge and the evident room for improvement. This work of the Bureau will no doubt do much to improve conditions. As to his own work in melting iron in vacuo Dr. Yensen said that, while iron may be thus completely degasified, he has small ingots which kept in vacuo for several hours and allowed to come to room temperature still contained blow holes.

Referring to Dr. Cain's new method of determining carbon in steel by the difference in electrical resistance of barium hydrate solution after its absorption of CO₂ gas, Dr. Yensen stated that the research department of the Westinghouse Electric & Mfg. Co. had worked out a still more accurate method, accurate to 0.0001 of 1 per cent by freezing out the CO₂ allowing it to expand to a known volume and measuring the pressure.

The question of the effect of gases on open-hearth or ingot iron was brought up by J. A. Aupperle, American Rolling Mill Co., Middletown, Ohio, when he stated that certain gases have certain effects, particularly nitrogen, on the permanency of certain enamels in that it hastens corrosion.

Prof. Joseph W. Richards, who presided over this meeting, suggested the probability that the presence of vanadium or some such element in the pig iron used in making the steel might act as a protective agent against such deleterious effects of gases.

Dr. Cain, in closing the discussion, stated that his new method for determining carbon in steel could be made still more accurate by means of slight modifications. As to Dr. Unger's criticisms, he felt that accurate methods of analysis were of first importance.

Increasing the Properties of Test Pieces

Another interesting paper on the program of this meeting was written by G. A. Reinhardt, metallurgist, and H. L. Cutler, assistant metallurgist, Youngstown Sheet & Tube Co., on the subject "Effect of Time and Low Temperature in Physical Properties of Medium-Carbon Steel." It was presented in brief abstract by W. N. Crafts, British Forgings, Ltd., Toronto, Canada, who stated that the principal point in the paper was that it had been found that certain heats of low carbon steel were failing to pass the specifications. By allowing the test pieces to stand, it was found that the physical results improved by 5 to 10 degrees. This was done by either letting them stand 16 days at low temperatures or by subjecting them to a temperature of about 120 deg. C for 25 hours. In this way an elongation sufficient to pass the requirements was obtained. It was suggested that the resting of the steel after its working was the explanation of the better properties.

Mr. Crafts stated that his own experience tended to verify the author's results. He had found at his own plant that on certain cast steel shell blanks, a rest of five days for the test pieces at normal room temperature would raise the elongation 1 per cent each day. It was true, however, that this applied to certain steels and not to others. At his plant shell blanks came from several American steel foundries and it was observed that those plants which poured their heats the hottest produced the heats that did not benefit by any resting treatment. Mr. Crafts also raised the question as to whether this practice was honest at which suggestion Dr. Richards expressed the possibility that it might be necessary to add to certain steel specifications a clause covering such cases.

Blast Furnace Refractories

"Blast Furnace Refractories," by R. M. Howe, Mellon Institute, Pittsburgh, was offered in abstract by the author. The paper is a summary of the replies to a questionnaire sent to various users of such refractories asking them to outline their experiences. The seven factors that influence the manufacture of fire-brick are discussed and the importance of proper installation reviewed.

The paper was discussed by Dr. Unger, who expressed his hearty agreement that greater uniformity in the making and use of brick was desirable. It is a fact that of the brick in a used blast-furnace lining some will project beyond the others standing out alone or in small groups while the surrounding ones will be worn away. Dr. Unger outlined certain variations such as a range of 9 to 12 per cent of moisture in the pug as the bricks were being made, a range of from 662 to 1708 lb. per sq. in. of crushing strength in a group of 10 samples, and other similar cases.

Papers on "Effervescing Steels" by Henry D. Hibbard, consulting engineer, Plainfield, N. J.; on "Air-craft Steels" by Dr. Albert Sauveur; on "Erosion Tests of Rifle Barrels" [THE IRON AGE, July 24, 1919] by A. E. Bellis, major, ordnance department, Springfield, Mass., and on "Metallography of Rifle-Barrel Steel" [THE IRON AGE, July 24, 1919] by G. F. Butterworth, Jr., metallographer, U. S. Army, Springfield, Mass., were all read by title in the absence of the authors and not discussed.

Swedish Electric Pig Iron

At the close of this meeting, the chairman, Professor Richards, briefly recounted some facts he had ascertained regarding electric furnace pig iron on a visit the past summer to Sweden and Norway. He was

fortunate in seeing in operation 11 out of Sweden's 12 electric pig-iron furnaces. In all cases, two at Trollhatten, four at Domnarfret and five at Hagefors, they were running successfully and on a commercial scale. Each plant gave every evidence of this. The last one erected at Domnarfret is a 4500-kw. furnace. The furnaces are surpassing the blast furnaces and it is Dr. Richards' opinion that no more of the latter would be erected in Sweden in the future as the electric furnace requires only one-third as much charcoal as the blast furnace and the pig iron produced is considerably better as to phosphorus. Charcoal is also cheaper there now than coke. At Lulea plans are maturing for the erection of six more such furnaces.

In Italy, said Dr. Richards, Ansaldo, Ltd., Genoa, is now building six electric smelting furnaces in northern Italy where a very pure iron ore is available. The company, of which Dr. Giolitti is the head, is also putting in 10 electric steel furnaces. It is understood also that two pig iron furnaces are being built in Japan.

In Sweden electric power, which formerly cost \$8 per hp. yr. now ranges from \$10 to \$12.

Dr. Richards visited the largest electric steel plant in Norway, the Stavanger Electro Steel Co., at Stavanger. Here he said scrap was being melted in open-hearth furnaces and refined in electric induction furnaces. Now, as power is only \$6 per hp. yr., the company is melting scrap in a Frick and a Heroult furnace.

Labor conditions in both Sweden and Norway were characterized as being serious, worse than in the United States. In Norway in particular the 6-hr. day and high wages were the extreme demands and in many cases plants were shut down rather than operate. Not a carbide plant in Norway is running and Canadian carbide can be laid down in Norway cheaper than it can be made there.

The Steel Rail Situation

Two pioneers in the earlier history of two phases of the steel industry contributed to an important part of the convention program. On Wednesday evening, Sept. 24, Robert W. Hunt, president R. W. Hunt & Co., Chicago, read a paper on "The Manufacture of Steel Rails," on which subject he is considered an authority, and C. L. Huston, president Lukens Steel Co., Coatesville, Pa., made an informal address on "The World's Largest Plate Mill."

Captain Hunt's paper is an important contribution to the subject of steel rails and will be given further attention in a later issue of THE IRON AGE. The early part of the paper gives his experiences in studying the need of rail specifications and his efforts to educate makers and users to adopt some set of rules. His own recommendations are reviewed and the evolution of present day practice is recounted. Two of his most striking recommendations refer to the use of hot tops for the ingots from which the rails are made and the use of molten ferromanganese and other alloys in the manufacture of the steel. "As yet hot-top ingots are not used in rail making," said Mr. Hunt, and "while I am not at this time prepared to incorporate hot-top ingots in rail specifications, the time is near when it will be entirely practical to do so. Success with them is bound to come." As to molten manganese alloys, his testimony was that the results obtained from this practice "from a metallurgical point of view have been very satisfactory and specifications should insist on this practice."

The discussion of this paper was not as general as it should have been. Dr. George B. Waterhouse, metallurgist Lackawanna Steel Co., Buffalo, read a written discussion which was in part as follows:

Captain Hunt refers to the crescent shape base failures and describes them as ruptures in the rail flanges extending from the outside inward toward the web. This is hardly correct and may be misleading. It has been shown over and over again that the base breaks originating in seams invariably start at the center of the rail base, and run longitudinally in varying lengths from 3 in. to 12 in. and sometimes longer. The major part run in length from 5 in. to 8 in. and then curve outward to the edge of the flange. The split at the center of the base may exist for an in-

definite time and not be discovered until the break shows on top of the flange or the piece of flange breaks off.

The stresses that cause the break are explained in two ways: By eccentric bearing of the rail base, that is, taking contact at one side or edge and bringing excessive strain at center of the base which starts fracture in any seam that may be present at that point, or the split may be due to cross strain in base where this member is thrown into compression, as happens where a pair of trucks are on opposite sides of the cross tie or rail base bearing and the head is put in tension.

From a careful study of "split base breaks" it has been found that fully 95 per cent occur on the tie bearing which gives further evidence that the above described causes for the initial break are probably correct. These split base breaks are almost invariably progressive, but always start at the center of the rail base running longitudinally.

A decided advance in rail production was the invention of the deseaming machine of the Lackawanna Steel Co., referred to by Captain Hunt. It was developed in 1913 and put into use Jan. 1, 1914, deseaming the bottom of the base only. The same year, July 13, both head and base began to be deseamed, and the machine has been in constant operation ever since, the amount of rails deseamed being approximately 1,000,000 tons.

This machine was thoroughly described by Captain Hunt in a paper before the American Society of Mechanical Engineers, December, 1914, but a brief description description here may be of interest.

The process consists essentially in treating the rail bar while hot and during the rolling by milling off the surface of the head and base sufficiently to secure freedom from surface defects. Not only are the seams in the head and base eliminated, but the softer partially decarburized surface is also removed, so that the rolls in the remaining passes do their work on the true higher carbon steel of the rail bar. The deseaming machine subjects the hot rail bar on top and bottom surfaces to the cutting or milling action of teeth on two opposed rotating saw discs. The rail bar with head down is forced between the saw discs by a pair of driven pinch rolls, adjustable to bars of various sizes and having guides for the top, bottom and sides of the bar. Adjustment at the saws is made for a cut $\frac{1}{8}$ in. or at the most $\frac{3}{16}$ in. deep.

A second set of driven pinch rolls, on the delivery side, helps to force the bar against the cut of the saw teeth and here also a second set of guides helps to hold the bar rigidly and firmly during passage through the saw. From the second set of pinch rolls the bar goes along the table to the finishing rolls and receives five finishing passes. The hot rail bars enter the machine at a speed of about 350 ft. per min., is slowed down by the cutting operation to about 80 ft. per min., and on leaving the saw rapidly picks up speed until it enters the finishing stand at about 500 ft. per min. Both saw discs are approximately 8 in. wide.

Both are belt driven from motors. They are 5 ft. diameter, with V-shaped teeth of $\frac{3}{4}$ in. pitch. The peripheral speed is 25,000 ft. per min. The teeth stand up well and the saws mill at least 30,000 tons of rails without requiring dressing.

The main objects realized by this process are the production of rails with the bottom of the base free from seams and surface defects, and the top of the head in the same condition, thus exposing to the wheel pressures solid clean metal free from decarburized weak surface material. The improvement in head surface is of special importance in regard to wear and flow of metal. The deseaming gives the user the benefit of hard homogeneous metal at top surface of rail head in the initial use, which will not break down or crush over the corner of the head as often takes place with rails that have not been deseamed. This is most desirable as it pertains to the running and service, but the improvement in the base as a safeguard against the danger of breakage is far more important.

It is probable that the split base failure has existed to some extent ever since T rails were put into use, but it first received special attention after A. S. C. E. Standard Sections were adopted and tie plates became a part of standard track construction. The A. S. C. E. sections were revised into the A. R. A. sections having a thicker base. This no doubt reduced base failures and also the use of open-hearth steel helped a great deal. None of these revisions, however, has completely overcome base failures. The deseaming process has been very successful in this respect.

The statistics for rail failures, mentioned by Captain Hunt, ending Oct. 31, 1917, and collected by the American Railway Engineering Association gives information on this point. This is not all the tonnage made but is all the tonnage on which there is information. The total base failures in the 112,936 tons of Lackawanna open-hearth rails

rolled in 1914 are only two in number. Out of the 112,936 tons rolled in 1915 only four. From the 141,966 tons rolled in 1916 only four, and none so far reported from the 97,558 tons rolled in 1917. The statistics available to date are to Oct. 31, 1917. The deseaming process was started in January, 1914, and out of the 219,376 tons rolled in 1913 which were not deseamed, 62 base failures have been reported to date. In other words out of approximately 500,000 tons of rails reported on, only 10 base failures have developed, which is very striking. The results with five other mills over the same space of time is 249 base failures out of approximately three million tons of rails.

Mr. Huston did not present a paper but gave an informal talk on the early history of making plate at Coatesville and a description of the company's latest mill which is the largest steel plate mill in the world. Motion pictures of the mill in operation were presented. This plant was described in THE IRON AGE, Jan. 2, 1919.

Steel Castings and Their Heat Treatment

"Heat Treatment of Cast Steel" by John Howe Hall, metallurgist Taylor-Wharton Iron & Steel Co., High Bridge, N. J., was an important contribution to a meeting of the iron and steel section on Wednesday morning, Sept. 24. Dr. John A. Mathews was the chairman. The paper is a comprehensive discussion in general of the effect of various methods of annealing and treatment of ordinary carbon castings, the fact being granted at the outset that to obtain the best properties, it is necessary to secure a fine structure. Some of the factors working against this are outlined and it was demonstrated by Mr. Hall, who presented an abstract, that it is not possible to get the desired and best structure except by rapid cooling in the air. The double heat-treatment method is also recommended and some data on the results so attained are given. The paper also goes into the subject of 1 to 1.50 per cent manganese steel castings and their excellent and unusual properties. A more extended abstract of this paper will appear in a later issue of THE IRON AGE.

Dr. Henry M. Howe of the National Research Council discussed the paper and showed that the islands of ferrite obtained by the slow cooling of castings in annealing are similar to ghost lines in forgings. He spoke of the fact that there is often in such cases more ferrite present than corresponds to the carbon content and that the presence of phosphorus and oxygen are contributing agents to the formation of such islands or ghosts in that their rate of diffusion is so slow. Unless the annealing is spread over a very long period there is no effect on these ferrite islands. Rapid cooling affords no time for such concentration and is therefore the most effective remedy.

Manganese and Nickel in Castings

Dr. Howe in speaking of manganese castings stated that manganese and nickel were related in their effect, that is, that 12 per cent of manganese is equivalent to 25 per cent of nickel or half the amount of the former accomplishes about as much as twice the amount of nickel.

Mr. Hall stated later that it was noticeable that as between electric and converter steels the former seemed to reveal less tendency to ghost lines or ferrite islands because of the relatively lower amount of phosphorus.

Properties of Quenching Liquids

An important paper presented at this session was entitled "Cooling Properties of Technical Quenching Liquids" by N. B. Pilling and T. D. Lynch, metallurgist and research engineer respectively of the Westinghouse Electric & Mfg. Co. The paper gives in detail the results of experiments undertaken with the idea of obtaining information of a quantitative nature regarding the quenching properties of a number of liquids used commercially in hardening steel. Water, brine, soap solution, three different oils and also sulphuric acid were used and curves plotted to show the quenching power of each. Sulphuric acid afforded the best quenching power with brine next, water third, one of the three oils fourth and soap solution last.

Dr. Mathews in introducing the discussion characterized the paper as a piece of fine experimental work, accurately done and possessing important practical bearing. Dr. Howe welcomed the work as a very careful analysis affording valuable results. He suggested that a checking of the inferences would be advisable and outlined a method.

Impact Tests

While the paper "Experimental Data Obtained on Charpy Impact Machines" by F. C. Langenberg was only presented by title, some interesting discussion was offered. Lieutenant Commander A. G. Zimmerman of the Naval Gun Factory at Washington recounted some interesting investigations in progress there with a machine which is able to record at the same time both the shock or fatigue value of the steel and the tensile or static strength. As to the notch tests, he could not report favorable and concordant results. This fact was also verified by others.

Pyrometry and the Steel Industry

A session on pyrometry with special reference to iron and steel metallurgy, at which George K. Burgess, Bureau of Standards, Washington, presided, held Wednesday afternoon, Sept. 24, had to do with the application of pyrometers to various phases of the steel industry.

Of particular interest was the Report of the Committee on Pyrometry of the National Research Council, presented by Dr. Burgess and one or two other papers which had to do particularly with the efforts and studies that are and have been made to determine the temperature, in open-hearth furnaces in particular, with reliable accuracy. It was developed that considerable progress has been made and that, as soon as reliable methods and instruments are developed, some exceedingly interesting studies with valuable results will be possible.

F. E. Bash, research engineer, Leeds & Northrop

Co., Philadelphia, in a paper, "Electric, Open-Hearth and Bessemer Steel Temperatures," brought out the fact, based on comparative temperatures which he had taken, that there was very little difference in the temperature of electric and open-hearth steel with the difference in favor of the open-hearth—a rather surprising announcement. This conclusion is based on tapping temperatures from electric furnaces of different sizes in various plants and from a number of open-hearth furnaces handling the same kind of steel.

German Versus American Steel

A statement attributed to W. L. Saunders, head of the naval consulting board and director of many large manufacturing companies, such as the Ingersoll-Rand company, that he has already placed orders in Germany or will do so for large quantities of high quality steel for use in America, brought a flood of protest Tuesday, Sept. 23, from some of the leading engineers of the United States at the American Institute of Mining and Metallurgical Engineers' meeting at the Congress Hotel.

C. F. W. Rys, chief metallurgist Carnegie Steel Co., Pittsburgh; Dr. Mathews, president Halcomb Steel Co., Syracuse, N. Y., and Dr. Burgess, chief metallurgist, United States Bureau of Standards, were among those men who indignantly rose in protest. According to these men, whose statements were echoed by those present, the steel mills of the United States can and do produce a quality of steel as fine as any produced in Germany.

"There is no necessity for Mr. Saunders or anyone else going into the German market for steel to be used in any sort of manufacturing in this country," said Mr. Rys. "American steel makers are daily putting out steel suitable for the finest instruments and machinery, and they can make steel of any quality in any quantity demanded. It is due to the American market to patronize local manufacturers when they can supply the requisite article."

American Steel Treathers' Society

A HIGH degree of merit characterized the first annual convention and exhibition of the American Steel Treathers Society. The completeness and display of the exhibition was a revelation to all who were fortunate to attend, situated as it was several miles from the meeting place of the other conventions. Both the exhibition and the convention were held at the Seventh Regiment Armory, 34th Street and Wentworth Avenue.

On the first three days of the week, technical sessions were held morning, afternoon and evening. The array of subjects would do credit to a much older organization. At the exhibition itself there was an imposing number of exhibitors of all kinds of heat-treating apparatus, including pyrometers, furnaces, apparatus for holding quenching and heat treating solutions and mediums as well as several steel companies making high-speed and other heat-treated products. In all there were nearly 85 exhibitors. The Midvale Steel & Ordnance Co. and one or two others maintained moving picture shows of some of the features of their plants. Several companies were reported as unusually successful in making sales of their products.

At the various technical sessions nearly 40 papers on heat treatment and allied subjects were presented by metallurgists and operating men in representative companies from all over the country. None of the papers were printed for distribution. Most of them will appear in the society's Journal, a monthly publication.

Heat Treatment and Production

The first technical session presided over by T. E. Barker, president of the national organization, was opened by an address of welcome by Harry H. Merrick, president Chicago Association of Commerce. Mr. Merrick emphasized the importance of the society in relation to increased production which, he said, is the

great need of the day. This idea assumed more concrete form in the first paper read before the convention, that of C. P. Berg, president C. P. Berg & Co., consulting engineers, Chicago, entitled, "Relation of Heat Treatment, Design and Selection of Steels for Metal Cutting Tools to Factory Production." He discussed at length the relation of heat treatment, design and selection of steels for metal cutting tools to factory production. He pointed out that present practices in machine shops are such as to make it extremely difficult or impossible to trace the causes of tool failures.

Metal cutting tools contain no marks of identification as to the manufacturer of the steel or the conditions under which it was treated. Often a tool will render unsatisfactory service, not because of improper heat treating of the metal or the use of the wrong kind of tool steel, but because improper methods of regrinding and sharpening by the user. A tool, in fact, is redesigned every time it is reground and the absence of standards of design and established rules for grinding and sharpening in machine shops makes the future effectiveness of the tool a matter of chance. Tools, said Mr. Berg, should be made of a few steels of known characteristics so that the machine tool operator can be instructed as to the appropriate speeds at which they can be successfully employed, the kind of work to which they are adapted, and the proper designs to follow in regrinding them. High speed steel, he pointed out, was more or less of a fad during the war and was often used for work to which it is not suited. It is not a success when employed for finishing cuts, as it will not keep an edge. Efforts to use it for this purpose have resulted in much loss of time in regrinding.

It was suggested in the discussion of Mr. Berg's paper that in shops engaged in quantity production it has proved advantageous to assign tool grinding to one operative thoroughly versed in tool angles.

Manufacture of High Speed Steel

"Metallurgy in the Manufacture of High Speed Steel" was the subject of a paper by Roy C. McKenna, president Vanadium Alloy Steel Co., Latrobe, Pa. High speed steel, he said, contains approximately 24 per cent of alloying metals, i. e. tungsten, chromium, vanadium, silicon, manganese, and in addition often cobalt, molybdenum, uranium, nickel, tin, copper and arsenic. Steel to be within generally accepted analysis should contain over 16 per cent and under 20 per cent of tungsten. If of lower tungsten content, it should carry proportionately more chromium and vanadium. Combined action of tungsten and chromium in steel gives to it the remarkable property of maintaining its cutting edge at relatively high temperature. This quality is commonly known as red hardness. Vanadium imparts a high cutting efficiency. Prof. J. O. Arnold, of the University of Sheffield, England, said recently that high speed steels containing vanadium have a mean efficiency of 108.9, as against a mean efficiency of 61.9 obtained from high speed steel without vanadium content. The ideal analysis of high speed steel containing 18 per cent tungsten is chromium, 3.85 per cent; vanadium, 0.85 to 1.10 per cent and carbon, 0.62 to 0.77 per cent. Sulphur and phosphorus are injurious, causing red shortness and cold shortness respectively. High speed steel should not contain more

than 0.02 per cent sulphur and 0.025 per cent phosphorus.

Mr. McKenna followed the making of high speed steel step by step, from the raw material to the finished product. In preparation of bars of high speed steel for annealing, he asstated, the bars are packed in tubes with a mixture of charcoal, lime and other material, following which the tube is sealed and placed in an annealing furnace. The temperature is gradually raised to about 1650 deg. Fah. and then held for a sufficient length of time depending upon the size of the bars. After very slow cooling the bars are removed from the tube when they should show a Brinell number of 235 to 275.

The purpose of heat treating high speed steel, Mr. McKenna said, is to produce a tool that will cut with a maximum productive efficiency. The cutting efficiency depends on the thermal stability of the complex hardenites, existing in the hardened and tempered high speed steel. Complex hardenites are produced by heating the steel to a very high temperature, near the melting point, which throws into solution carbides and tungstides, provided they have been properly broken up in the hammering process and uniformly distributed throughout the steel. By quenching the steel at cor-

(Continued on page 1109)

BOILER MAKERS' MEETING

Costs and Overhead Discussed—Labor Shortage and Many Incompetent Workers

The American Boiler Manufacturers' Association held its quarterly conference at the Hotel Astor, New York, Sept. 24, 50 members being in attendance. The session was opened by the president, W. C. Connelly of the D. Connelly Boiler Co., Cleveland, and was largely devoted to a consideration of cost finding in boiler manufacture, and in particular as regards the adoption of a substantially uniform estimate sheet. The matter as to method of charging overhead was also discussed at length.

Reports on conditions in the industry made at that time show that boiler shops were then facing a shortage of workmen and general inability to secure the number needed for full operation. Under the circumstances many of those being taken on are incompetent. Serious labor troubles have appeared in some sections. In Michigan this has resulted in many of the men scattering so that it is difficult to bring back the necessary number of workers. At New York unsatisfactory labor conditions prevail. The men show no great inclination to work and shops are operating about 44 hr. a week, 8 hours a day and 4 hr. on Saturday. It is understood that a 48-hr. week was contemplated, but workers, especially in the ship repair yards about New York harbor, in many cases recently left work at noon Saturday, and upon their return Monday morning were locked out. Two or three large shops of this kind have a great many of their men working, but a large percentage are still out for this reason. The situation in boiler works and shipyards is very much the same as in machine shops in that locality. In other sections of the country the working week varies from 55 hr. to 50 hr. In New England business is not as good as in some other sections, notably in the Central South, where orders have piled up in considerable quantities for equipping the oil industry.

The attention of the members was called to a clause in the boiler code of the State of New York referring to horizontal tubular boilers, that "no pressure shall be allowed on a boiler on which a crack is discovered along the longitudinal rivet joining." Also to a footnote referring to it, stating that the intent of the clause is to permanently discontinue the shell or drum of a boiler for steam boiler purposes should such a crack be discovered in any place of the shell or drum, and it was pointed out that this would require a practical rebuilding of the boiler instead of repairing it and that it would involve onerous expense to take down and re-

move such boilers already installed under sidewalks and in similar places.

The next meeting of the association will be held about Dec. 20, but the place of meeting has not yet been decided upon.

Limited Shipments to Canada

TORONTO, Nov. 25.—Although claims made by steel mills of the United States state that production has reached 70 per cent in some cases, it is far from being reflected in the shipments of material coming to Canada. There are large warehousing interests that have been in business here for years, whose stocks are cleaned out, and who have not received a shipment for over a month of either sheets or plates. Moreover, they cannot get any of their mills in the United States to take on business for future delivery. The impression seems to have been given out that the mills are practically out of the market until they have won the strike.

Manufacturing programs are being seriously interfered with in shops where no stock of material is kept. Lots of seconds in sheets are being eagerly snapped up and a chance taken on what they can work out of the assortment. Premiums are the order of the day when any of the much-wanted material gets into the hands of the jobbers.

As a result of the United States strike, the mills of the Algoma Steel Corporation and of the Steel Co. of Canada at Hamilton are booked for five to six months, particularly in sheets and bars.

New German Ore Deposits Found

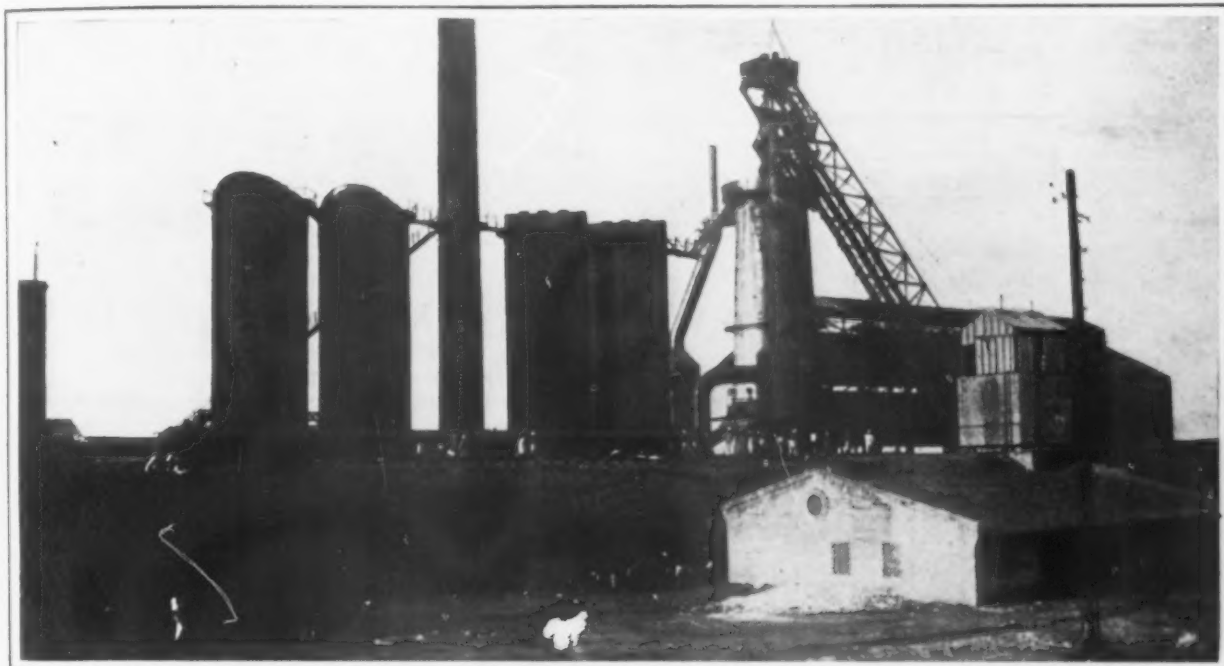
WASHINGTON, Nov. 10.—According to reports to the Bureau of Foreign and Domestic Commerce, new German iron and manganese deposits have been found in the Idarwald, about 30 miles south of Coblenz, Germany. It was known, says the report, before the war that there were deposits of iron ore in this region, but with the Lorraine iron fields in their possession the Germans did not consider the exploitation of the ore deposits in the Idarwald profitable enough. The work of the last few months, however, has given very satisfactory results, and it appears that the whole of Idarwald contains rich ore deposits. Deposits have already been discovered in the regions of Rhaunen-Sulzbach, Weitersbach and Horbruch (12 miles west by south of Berncastel). The ore has been discovered at a depth of 6 to 10 ft., but in several places also just below the surface. Analysis shows that it contains from 55 to 60 per cent metal and up to 30 per cent manganese. Its transport could be effected at a small cost by means of the Hunsrueck Railway.

BATTELLE FURNACE IN INDIA

Reconstructed Alabama Stack Making Iron Half Way Around the Globe

George Gordon Green, who was in charge of Battelle furnace at Battelle, Ala., in 1917, when the stack was bought by Perin & Marshall, New York, to be taken down and removed to India for re-erection at the plant of the Tata Iron & Steel Co., accompanied the furnace

"Tucked away at the foot of Dalma, 155 miles due west of Calcutta, India, on the Bengal-Nagpur Railway, is the flourishing town of Jamshedpur, a far cry from that little sleeping hamlet in Alabama. But the war came, great quantities of steel rails were needed to 'carry on' in Mesopotamia, and to make the steel, great quantities of ferromanganese; and the powers that be reached from the heart of far away India to that little lazy hamlet in sunny Alabam' and woke the sleeper from her eleven-year coma.



Battelle Furnace in Its New Berth in India. Over the cast house in lower picture may be seen the open-hearth furnace stacks



and equipment on their long journey to the other side of the globe. At Battelle he had assisted in taking down the furnace and in India he had a part in superintending its erection. In sending to this country the two views of the furnace in its new location, which are reproduced on this page, Mr. Green wrote briefly of the whole undertaking as it impressed him, and his description will be of interest to readers of THE IRON AGE:

"Tucked away at the foot of Lookout Mountain, 34 miles south of Chattanooga, Tenn., is a 'flag stop' on the A. G. S. Railway, called Battelle. There, from a little cottage within walking distance, we could see the huge, silent furnace—silent for eleven years—the stacks grim and lifeless against the sky.

"In August, 1917, the Battelle furnace was bought in ten days, taken down bit by bit in seventy days, shipped to New Orleans, and from that port was carried by steamship 16,000 miles by way of South Africa, more than half way around the earth, to the port of Calcutta on the treacherous Hoogly River. From there she came by rail to Jamshedpur, where she was erected by the selfsame men who took her down. To-day, Aug. 25, 1919, two years to a day from the day work was started in taking her down, she is making iron, standing cheek by jowl with her foreign sister furnaces. And we, who followed her half way round the world, put her together again and made her 'go,' can look up, away off here in India, and see Battelle once more flinging her smoke plumes against the sky—Battelle,

living and breathing again. And we, who have known her and loved her so long, thrill to have had our small share in the glory of her resurrection, not the least of the glory being that she was the first furnace to have

crossed the sea, to have crossed the equator twice and to have made iron on two continents with half the world between, the difference in time between Chattanooga and Jamshedpur being exactly 12 hours."

Address of Head of Great Creusot Works

Eugene Schneider Presents Interesting Facts at Banquet of American Iron and Steel Institute

In his address at the banquet of the American Iron and Steel Institute in New York, Oct. 24, Eugene Schneider, head of the Creusot works and owning a controlling interest in so many others that in informal



EUGENE SCHNEIDER

conversation he admitted to being an employer of over 80,000 people, acknowledged at the outset his election to honorary membership in the institute. "As honorary president of the *Comite des Forges* in France," he said, "and chairman of the Iron and Steel Institute in Great Britain and now, through your courtesy, one of yourselves, participation in my triple capacity in your banquet to-night is a symbol of the

alliance between America, England and France, which is the best guaranty of peace in the world.

"During the war," he continued, "aside from obtaining steel from you, my workers were in collaboration with yours. We pooled our experience, our work, our devotion to that cause for which we fought side by side, and in this cooperation we have forged a very rare metal, a metal that is invisible and indestructible, the metal of Franco-American friendship."

War Efforts of French Steel Industry

His speech was given up largely to the French steel industry. Between 1903 and 1913 the production of pig iron was increased 87 per cent and steel 150 per cent. At the declaration of war "most of our directors, engineers, foremen and workmen were mobilized; 67 per cent were called to arms. As early as October, 1914, France was deprived of the twenty million tons of coal that the mines of the North and the Pas de Calais supplied. With one blow the steel industry lost 85 blast furnaces out of 136, 48 open-hearth furnaces out of 164 and 53 converters out of 100.

"Our means of production were reduced 81 per cent for pig iron and 63 per cent for steel, as compared with 1913. At the battle of the Marne our Government called upon us for a daily supply of 100,000 shells for 75 mm. guns. We were not producing even 20,000.

"In July, 1915, we had only 20 stacks at work. In January, 1916, we had 40 and in January, 1918, 57. Before the armistice, in September, 1918, we had 59 in operation, 30 were down, and 13 in course of construction—a total of 102. Little by little we had made up for the enormous losses caused by the German invasion. In July, 1915, we had at our disposal 100 open-hearth furnaces, 6 down and 35 in course of construction. In September, 1918, we had 165 open-hearth furnaces in operation, 16 down and 44 in course of construction. In January, 1916, we had 1305 crucible furnaces. In September, 1918, we had 2459. In January, 1916, we had 21 electric furnaces; in September, 1918, we had 40.

"The result of this effort was that for every 100 rifles manufactured in 1914 there were 29,000 in 1918. For every 100 machine guns in 1914 we manufactured 7000 in 1918. At the beginning of the war we turned out each day 13,000 shells for the 75's and 200 for the 155's. In 1918 our production was 200,000 for the 75's and 45,000 for the 155's per day. In 1915 we manufactured only 2600 75-mm. guns; two years later we manufactured 11,000. Every one knows that the surprise of the first battles of the war came chiefly from Germany's overwhelming superiority in heavy artillery. At the time of the armistice we had 6500 heavy guns—3400 short 155's, 1100 long 155's, together with other sizes up to 21 in. France was thus enabled not only to meet her own needs, but was in a position to equip the entire Serbian army, to send considerable quantities of heavy artillery, rifles and machine guns to Russia, Roumania and Greece as well as to supply the American army with all the field artillery it needed and half the heavy artillery."

He claims that France now stands second as an iron and steel producing country, excelled only by the United States. The situation he summarized as follows:

Iron ore, 22,000,000 tons before the war; 43,000,000 tons after the war.

Pig iron, 5,000,000 tons before the war; 10,000,000 tons after the war.

Steel, 5,000,000 tons before the war; over 8,000,000 tons after the war.

Employee Representation

On the matter of social unrest, he pointed out that the crisis was reached between last May and July. The Union of Steel Workers and then the General Labor Federation which assembled at Lyons in September both repudiated the agitators who sought to lead them along the road to Bolshevism. The international strike that was called for July 21 was a complete failure. "It failed in France because the workers refused to follow the extremists."

For the past twenty years, he said, "the workers in my plants elect their own representatives. I no more ask them whether they are union men than what is their religion. At regular intervals we discuss with these representatives all questions relating to conditions and work. But it is equally understood that I reserve for myself the right to make decisions and to issue orders and not because I believe it a privilege that belongs to me individually. As an individual I have nothing, so to speak, to do with the case. The task that we have in common is the only thing that counts, and I enter into consideration individually, only in so far as no human enterprise can succeed without a guide or a leader to direct it.

French Steel and Iron Output in 1918

Consul General A. M. Thackara, at Paris, has sent to the Bureau of Foreign and Domestic Commerce, Washington, an interesting report on the economic conditions in France. He reports that statistics which would indicate in detail the results of the activities of the metallurgical industries of France during 1918, the last year of the war, are not available; but from official sources the following statement was prepared showing the weight in metric tons of the total output of pig iron, steel ingots and rolled products in 1918, as compared with the preceding year:

	1917 Metric tons.	1918 Metric tons.
Pig iron	1,684,023	1,261,670
Steel ingots	2,231,651	1,809,771
Rolled products	1,760,160	1,400,468
Total	5,675,834	4,471,909

British Steel Works Fuel Economy

Iron and Steel Institute Convention at
London Surveys Current Practice in
Great Britain, Lorraine and the Saar

THE operations of British blast furnaces and steel plants are susceptible of substantial new economies, according to a report of the British Association Fuel Economy Committee, relating to practice during 1914-15 and published by the Iron and Steel Institute for its autumn meeting, Sept. 18 and 19 at London. To initiate these improvements properly the committee, composed of Prof. W. A. Bone, Sir Robert A. Hadfield and Alfred Hutchinson, recommends the institution of a fuel engineering staff at such plants made up of men scientifically trained in combustion engineering. An almost virgin field in fuel economy is pointed out in the possible use of the heat now carried away and lost in the molten slag from the blast furnace.

Utilization of Surplus Gases

Large economies are yet to be effected in the utilization of surplus blast furnace and coke oven gases. Such gas, it is emphasized in the report, should be electrostatically cleaned to increase its thermal efficiency, and the practice of burning uncleaned blast furnace gas in Lancashire steam boilers, probably not exceeding 55 per cent in efficiency, should be done away with in favor of the gas engine and dynamo couple. Plants comprising complete works for smelting ore and rolling steel are shown to be approaching the day when apparatus, electrically driven from gas engines employing such gas, will supersede all steam driven engines, particularly in the blast engines where motor driven turbo-blowers will ultimately be used.

Some practical suggestions for obtaining the ideal fuel economy in steel manufacture call for a manufacturing unit including by-product coke ovens, blast furnaces, steel works and rolling mills. The coke ovens

in Durham and Cleveland, four in Lincolnshire, five in Sheffield, six in Midlands and one in Cumberland.

Reports from 21 blast furnace plants showed that the average coke consumption at seven in the Cleveland district smelting Cleveland ore was 23.5 cwt. (1 cwt. = 112 lb.) per ton of pig iron produced. It is calculated that this is equivalent to 32.65 cwt. or about 1.65 gross tons, based on the assumption that a good Durham coking coal yields in by-product ovens on the average 72 per cent of coke for the blast furnace, and surplus coke oven gas about 8000 cu. ft. of a gross calorific value of 485 B.t.u. per cu. ft. with a potential energy of 3,880,000 B.t.u. per ton of iron produced in the blast furnace. The average amount of other fuel used for calcining and other purposes would appear to be almost 3.5 cwt. per gross ton of iron produced, giving a total dry "coking coal" consumption per ton of iron produced of about 36.5 cwt. with 9000 cu. ft. surplus gas.

The estimate made by these firms of heat losses at the bells, boilers and stoves varies between 9 and 26 per cent of the total heat of combustion of the coke charged into the furnace, with an average of nearly 13.5 per cent. Of this surplus approximately 50 per cent is charged to the boilers, 30 per cent to the stoves and up to 20 per cent as surplus, giving an estimate of at least 15 per cent of total heat of combustion of coke charged in the boilers as the combined losses at the boilers and stoves. Total loss at bells, stoves and boilers, it was estimated, could hardly be less than 17.5 per cent and might be as high as 20 per cent. Well equipped steel works in this district consumed between 10 and 12.5 cwt. per ton of finished sections, above and beyond that used in connection with the blast furnaces.

Coal Consumptions in Four Steel Works Using "Molten Pig Processes" in Conjunction with Blast Furnaces

Metal charged per Ton of Ingots made.			Types and Sizes of Open-Hearth Furnaces	Actual Coal Consumption at Steel Works per Ton of Finished Sections.					Coal Consumption at Blast-Furnaces and Coke-Ovens per Ton Finished Sections.			Total Cwt. Coal Consumed from Ore to Finished Steel Sections
Molten Pig Iron. Cwt.	Cold Pig Iron. Cwt.	Cold Scrap. Cwt.		Open Hearth Furnaces. Cwt.	Soaking Pits or Reheating Furnaces. Cwt.	Rolling Mill Cwt.	Other Purposes Cwt.	Total Cwt.	At Coke Ovens Cwt.	For Calcining and other Purposes Cwt.	Total Cwt.	
16.16	1.63	0.13	Basic. 7 x 55 tons 2 x 65 tons	6.36	1.46	2.44	1.79	12.05	28.70	2.65	31.35	43.40
17.5	....	1.73	Basic. 1 x 250 tons Talbot 2 x 60 tons Wellmar	6.09	No blast furnace or coke oven gases used.		4.76	10.85	27.77	3.03	30.80	41.65
17.5	....	2.00	Basic. Talbots. 100 to 175 tons	6.00	3.50	3.50	2.00	15.00	40.00	.....	40.00	55.00
17.0	....	3.25	Basic. 4 x 45 tons producing high-grade alloy	7.00	3.00	No B.F. gas used	1.65	11.65	38.25	.....	38.25	49.90

should be of the regenerative type, and the blast furnaces should be fitted with double bells suitably dimensioned to insure the proper distribution of furnace materials. Furnace gases for heating the stoves should be dry cleaned and that intended for generating power in gas engines should be again refined to eliminate dust. Blast furnace and coke oven gases should be separately available where required throughout the plant with provision for mixing at the various points of consumption. Power house gas engines should preferably be driven by blast furnace gas only; for steel furnaces a mixture of the two gases to yield between 150 and 180 B.t.u. per cu. ft. should be used.

Fuel Consumptions

The findings of the committee were based on reports of fuel used in the production of structural steel, derived from 25 representative British steel plants, nine

The total coal consumption amounted to not less than 40 cwt. per ton of steel output.

For the group of four firms smelting Lincolnshire ores the average coke consumption in the blast furnace was estimated at about 33 cwt. per ton of pig iron produced and the corresponding estimated Yorkshire dry-coal consumption at the ovens about 47 cwt. or 2.35 tons with available surplus coke-oven gas of 11,750 cu. ft. of a total potential heating value of 5,700,000 B.t.u. per ton of iron produced. At two of these plants the total consumption from ore to finished sections came to 50 cwt. and 55 cwt. per ton respectively.

Of seven plants in the Midlands no detailed estimates were submitted of heat losses, although one plant reported the loss of the stoves 40 per cent and the boilers 57 per cent.

Six plants smelting hematite ores, three of which were attached to steel works, showed an average coke

consumption for the six plants of 21.33 cwt. per ton of iron produced, equivalent to 30 cwt. of dry Durham coal carbonized in by-product ovens.

The possible margin of economy in the Cleveland district works was placed by the committee at between 5 and 10 cwt. per ton of finished sections, and for the Lincolnshire works at a much higher unestimated amount.

Average returns show the coal consumed between casting the steel from the open hearth into ingots and finishing off the sections about equal to that consumed at the furnace. Almost all reveal a considerable loss of heat largely recoverable in waste heat boilers. The coal consumption at open hearth furnaces averaged 6.35 cwt. per ton of ingots by the molten pig process, 7.65 cwt. by the mixed process and 9.45 cwt. by the cold process. Almost all the returns relating to the waste gases from steel furnaces, soaking pits, boilers, etc., show a considerable loss of heat recoverable by means of waste-heat boilers.

Fuel Practice in Occupied German Territory

THE status of fuel economy in German iron and steel works in occupied territory on the left bank of the Rhine, comprising for the most part the Lorraine district, was investigated in April, 1919, by a special commission of the British Government, headed by Cosmo Johns, Sheffield, and Lawrence Ennis, Middlesborough. The survey clearly shows that in spite of adverse war conditions these plants have generally been employing the most modern standard fuel economies of recent practice. The Metz area was investigated by W. J. Jones, R. C. Harding and P. S. J. Cooper, the Cologne district by Dr. F. H. Hatch, J. Henderson and Dr. Mather.

Economies Recommended by the Commission

The lines along which further attempts to promote fuel economy in iron and steel works should be made, as indicated by this survey, were summarized by the committee as follows:

1.—The blast furnace gas should be cleaned, without loss of sensible heat, if the conditions render it possible, until the dust content is at least as low as 0.1

Two Sheffield firms reported that in melting steel in the crucible furnaces one consumed 2 tons 15 cwt. coke, the other 3 tons 7½ cwt. exclusive of annealing the pots.

Summary

A summary of conditions as reported by these 25 plants shows the possible economies somewhat as follows: Of the 21 plants reporting, only three furnaces were fitted with double bells, while two worked with open tops; only five used furnace gases in internal combustion engines for generating the blast; the remaining 16 all used steam-driven blast engines. Of the latter eight used exhaust steam for generating electricity in low-pressure turbo-alternators; other four used it for heating the boiler-feed water. In three of the remaining the steam engine was described as compound condensing. At least half of these firms apparently had no data sufficient to enable even an approximate estimate of heat losses of stove and boiler.

minimum. Even if compound condensing engines be preferred for the larger mills, most of the fuel for the extra boilers required would be cleaned blast furnace gas, but it would be necessary to burn that gas under proper conditions and to correctly adjust the gas-air ratio. In either case the consumption of coal would be reduced to a figure that would be inconsiderable, if not negligible.

The great works at Homecourt, just inside the old French frontier not far from Metz, it states, only used about 40 tons of coal per 24 hr. before the war for its large output, an actual example of a negligible coal consumption. The coke used in the blast furnaces there produced enough gas to furnish practically all the other fuel required in the iron and steel works.

Dependence on Westphalian Coke

For the reason that ore transportation is the more expensive most important iron and steel works were found on or near the Lorraine iron field and employed their own coke ovens, average ratio of ore to coal by

Examples of Installations of Large Gas Engines

Works	Number of Blast Furnaces	Blast Furnace Blowing Engines	Converter Blowing Engines	Electric Generators	Plants Steam
Hagondange	6	6—1500 hp. each	2—5000 hp. each	12—2500 to 3000 kw. each	Additional in all cases
Knutange	10	5—2000 hp. each	2—5000 hp. each	3—2800 kw. each	
Rombas	6	8—2000 hp. each	1—6000 hp. each	2—1100 kw. each	
Differdange	10	8—14000 hp. total	2—4000 hp. each	3—4000 kw. each	
Adolf Emil Hütte	6	8—1400 M ³ air capacity each	.....	12—20000 kw. total 9—1400 to 1500 kw. each

gm. per cu. m. It is only when this has been done that the gas can be used economically for any purpose in iron and steel works practice. It is only thus that any useful surplus can be obtained for use in the steel works. Gas intended for use as fuel in internal combustion engines should of course be still further cooled and cleaned.

2.—All power, whether compressed air for blast furnaces or converters, or electric energy, should be generated in gas driven prime-movers with only such steam turbines as are found necessary to deal with fluctuating loads. As much steam as possible should be furnished by waste-heat boilers attached to the large gas engines. These waste-heat boilers should be of the fire-tube type, not water tubes.

3.—If the linking up of the power stations of neighboring works is possible, then the whole of the steel works should be electrically driven.

4.—Cleaned blast furnace gas, of the standard suggested in paragraph 1, should be the principal fuel employed in melting and reheating furnaces. The attainment of sufficiently high temperatures in open hearth practice can be secured by enriching the available blast furnace gas with either coke oven gas or with some fuel rich in hydrocarbons.

These four conclusions, it is pointed out by the committee, would reduce the number of steam boilers to a

weight being placed at three to one. Except for those in the Saar Valley, the iron works visited used Westphalian coke. Economy in fuel rested in the scientific utilization of the blast furnace coke charge, a matter of prime importance for the reason that much of the increased cost of fuel throughout Europe is a permanent added burden to plant operation.

The dependence on Westphalian coke is a particular feature of the Lorraine iron district. On account of its friability Saar coke was in no case found to be carried any distance. The cost of producing a ton of pig iron in one of these largest works in April, 1919, is proportioned as: Iron ore 14.5 per cent, coke 54 per cent, labor and overhead charges 31.5 per cent.

Effective cleaning of the gas was everywhere characteristic of operations. In no instance was uncleaned gas used for stoves or boilers. The dust content of the gas was reduced to about 0.1 gm. per cu. m. before it was used for any heating purpose. Various cleaning systems were in use; wet towers and fans and the Zschöcke wet system were common, but there were also many installations of the Halberg-Beth dry cleaning system, a general practice in the Saar Valley. A second cleaning for gas for internal-combustion engines was invariably done by Theisen washers, which eliminated all but 0.001 to 0.003 gm. per cu. m., also serving to finally cool the gas.

Large Gas Engine Equipment

The use of large gas engines was notable, at many works these installations consisting of ten, twelve or more gas engines of from 1500 hp. to 5000 hp. Blowing engines for blast furnaces, Bessemer converters and electric power generation were nearly always gas driven—the more modern the works the larger the gas engine. It was everywhere found to be the policy to make the fullest possible use of blast furnace gas, but the large gas engine did not suffice to meet all demands made on it. It was excellent as a blowing engine either at half an atmosphere for the furnaces, or two and a half atmospheres for the converters; but the gas driven electric generators did not respond to the fluctuating demands from the steel works and usual practice was to install some steam-turbine-driven generators to give an elastic combination. The gas engine was the predominant partner and as a sign of coming development it was noted that the Volkingen works in the Saar Valley a waste-heat boiler had been installed to utilize the sensible heat of the exhaust gas of a 3000-hp. gas engine, the installation being said to yield 13 cu. m. of water evaporated at 15 atmospheres. Examples of installations of large gas engines are given in the following table:

The committee predicts the use of cooling water of the gas engine as feed water for the waste-heat boiler to give a combined efficiency unapproached by any other prime-mover.

A very interesting departure was noticed in the Rombas works. The basting furnaces were provided with four or five stoves, as was the general practice in the works visited; but a new furnace, just completed, had only three. There were, however, two recuperators added which utilized the heat in the products of combustion from the stoves to pre-heat the air used for the combustion of the gas used for heating. As an attempt to conserve some of the heat in the products of combustion coming away from a stove on gas, the recuperator was referred to as very suggestive. The products of combustion passed through tubes while the air for combustion passed around them.

General Practice

Manufacturing units as a rule contained both blast furnace and steel works, averaging 400,000 tons output of pig iron per year, some considerably larger. The basic Bessemer process was used everywhere for the conversion of liquid pig iron into steel. Basic open-hearth furnaces dealt with the scrap produced in the mills using from 20 to 25 per cent pig iron in the charges, and were therefore able to work on a low fuel consumption—about 250 kg. per ton of ingots on an average of the coal used. Electric furnaces were generally employed for using the liquid steel from the converters; and this combination of Bessemer converter, open-hearth furnace and electric furnace was another factor tending to fuel economy.

The high-phosphorus pig iron with low silicon and sulphur required by the basic Bessemer process is had at hand in the Lorraine ores and gives low silicon and sulphur as a result of good blast-furnace practice. Pig iron running below 1 per cent silicon and 0.06 to 0.07 in sulphur was the regular output. There was an ab-

sence of mixers for desiliconization. The only heating attempted was by means of blast-furnace gas, or more rarely coke-oven gas introduced by pipe through the openings in the top of the mixer to assist in keeping the slag liquid. At some works, liquid iron direct from the blast-furnace was used in the converters owing to the shortage of iron.

The fuel in open-hearth plants was producer-gas; and in one works the committee points out a significant step in the enrichment of it with coke-oven gas giving a much better hydrocarbon content.

The electric furnace showed nothing significant, the power consumption being in the neighborhood of 200 units per ton, depending on the class of steel made.

Heating of Ingots

The survey showed large numbers of unheated soaking-pits supplemented by some that were coal or producer-gas fired; but it was significant that in more than one instance preparations were being made to use regenerated blast-furnace gas in the fired soaking-pits. A mixture of blast-furnace and coke-oven gas was considered by Saar Valley works the most suitable fuel for continuous and other heating furnaces. Where solid fuel was used on grates or in gas producers, steps were being taken to use the regenerated blast-furnace gas.

For all heavier products the initial heat of the ingot from the soaking-pit was sufficient and only with small billets for wire rods or small sections was reheating necessary. The admirable layout of the mills rendered this possible through proper sequence of milling operations and small loss of time in transfers. Plate rolling-mills used single ingots for each plate, rolled down at high speed from one heat. The small number of reheating furnaces, other than the soaking-pits, even in the largest works was most significant.

Gas Cleaning

It was found that neither the electrostatic process for the precipitation of dust or fume from bases nor the enrichment of the blast-furnace air blast with oxygen, had been tried or even contemplated. A successful use of the Cottrell system would supersede the Halberg-Beth system, the committee predicted, in a similar way that it has replaced the bag system in non-ferrous smelters, and would permit the use of high temperature gases. The Theisen washer, the committee points out, would be an essential adjunct for cooling the gas for use in internal combustion engines. A further advantage would be the freedom from the necessity of cooling the gas used for stove heating or boiler firing.

Significant of the possible direction in which steel-works practice may trend the arrangement of the great Hagondange works completed by Thyssen, near Metz, just before the outbreak of the war; where it is emphasized by the committee, the steel works is completely electrified and the large blooming-mill has a 16,500 hp. motor at each end of the rolls. The majority of mills surveyed, however, were steam-driven, the steam being largely produced in gas-fired boilers, though some coal-fired boilers were always used. The engines were in nearly every case tandem compound condensing, with a central condensing station.

Discussion of Fuel Economy

PROF. W. A. Bone, London, in introducing the report on "Fuel Economy and Consumption in the Manufacture of Iron and Steel," explained that the consumption given in the table of coal consumption in works using molten pig in conjunction with blast-furnaces were based on the ton or ingots rolled into finished sections, and did not mean per ton of finished sections in the sense that allowance had been made for the wastage and for the ends cut off the sections and remelted. The object of the inquiries was to ascertain the present margin of practical economy to be attained.

COSMO JOHNS, Vickers, Ltd., Sheffield, referred to the criticism of British methods made to him by a

prominent Lorraine ironmaster of French extraction, to the effect that British units were too small and British ironmasters had no faith in the large gas engine. Gas cleaning was carried to such an extent in Lorraine that they were now worrying about the purity of the air for combustion and at one works had put up a shaft 90 ft. high in the hope of getting cleaner air for their gas engines.

Practical Considerations Affecting Gas Fuel Use

BENJAMIN TALBOT, Cargo Fleet Iron Co., Ltd., Middlesbrough, England, opened the general discussion, recalled that it was in the year 1904 when the first gas-engine came to Great Britain from Seraing. His company had put in seven Seraing engines at that time.

Those had been scrapped before the war, but his firm had obtained a second type of the erasing engine, which had been put in shortly before the war started. Those had also been scrapped, and at present they were installing a third series, which his firm had every reason to believe would be more satisfactory than the first designs.

He considered that wear on equipment was an important consideration. For instance, a coke-oven plant might last from seven to ten years, and the conditions of the walls would not be as good in the last part as it was in the beginning, and consequently there would be some loss of gas. The same applied to all the details, and leakage did occur. It was for that reason that he had desired to add an extra 2 cwt. for safety.

He also specified that the metallic content of the blast-furnace burden should be at least 42 per cent. When he had mentioned that figure he had not in view, should he say, the burdens such as were got in Lincolnshire, which necessarily took much more fuel in the blast furnace. Another important point, and one which he thought would be partly the means of obtaining the practical ideal, was that of linking up.

He emphatically objected to the suggestion that surplus power could be put into the public utility company cables. He was a strong believer in having the coke ovens at the blast furnaces, because he thought the blast-furnace manager should have absolute control of the manufacture of his coke. Some of the coke which was being made at the present time was of very inferior quality. If iron and steel makers were to obtain such economies they would have to go right back to the question of a satisfactory cleaning of the coal. Another point to make sure of was the use of coal of good coking quality, so that they should get the best yield and thus use a less quantity.

In the ideal plant which he had sketched out in the report he had said that he would like to see the use of blast-furnace gas in coke ovens, as a possible substitute for the 50 per cent of coke-oven gas now used. If that clean gas could be used he would rather have a surplus of coke-oven gas to deal with than a surplus of blast-furnace gas. Blast-furnace gas was undoubtedly an ideal fuel when compared with coke-oven gas for gas-engine purpose, but the week-end had to be taken into consideration. If the coke-oven gas could be stored it could be used lighting the neighborhood or for heating for domestic use, and it would probably be found that by means of storage alone the week-end conditions would supply the district in light and heat for the remainder of the week.

Again, he wanted to see the matter thoroughly thrashed out in connection with the open-hearth furnace. If coke-oven gas was the ideal fuel—a matter had not yet thoroughly investigated—it opened up another point in the question of furnace design. It was going to simplify them to begin with. The gas products for open-hearth furnaces could be done away with. This also suggested the possibility of largely increasing the units. For that reason he advocated the use of coke-oven gas, and for that purpose he desired to get the total quantity available. He noticed in Messrs. Cosmo Johns' and Lawrence Ennis's paper that they practically advocated the gas engine as the prime-mover, and, of course, they gave ideal fuel conditions. It would have been more interesting if they could have had a works which was entirely open hearth. Fuel records manifestly must be very good from basic-Bessemer practice.

Cost of New Plant a Factor

ANDREW LAMBERTON, Sunnyside Engine Works, Coatbridge, questioned if all the new plant referred to had to be installed in order to get the results shown, whether the saving would pay for the cost. There must be a balance-sheet made out to show that, if such an enormous outlay was required in order to bring about the condition of things stated in the paper, it would pay for the saving effected in the original coal. Nobody could say how much they would return in profit to the steelworks.

W. H. HEWLETT, Wigan Coal & Iron Co., Wigan, said the point really to be considered was the expendi-

ture which had to be incurred in order to clean the gases effectually. There seemed to be some doubt as to what type of gas engine would clean the gases effectually.

F. W. HARBORD, metallurgical engineer, London, observed that there were set forth in Professor Bone's paper certain definite means of economy. It was shown to be the fact that a great number of works had not made those modifications in their plants, many of which would not be at all costly in proportion to the saving gained. The fact had to be recognized that with regard to works which were engaged with special classes of steel, such as axles and tires, it was impossible to bring on to one site coke-oven plants, and so on. He understood from the firms with which he had to do and which were using them that they gave perfectly satisfactory results.

With regard to dry cleaning, he thought that everybody was agreed that the difficulty had been to get a dry cleaner which worked satisfactorily, and he did not know of any plant which was economical. There again the question of cost came in, both for dry and wet cleaning, and at the present time of very high prices, it was doubly important. All the figures given in the paper had dealt with work under the very best conditions making only the larger structural sections. He thought it ought to be made very clear to everybody that that in no way represented, even approximately, what could be hoped for as the fuel consumption per finished section on all the steel made in Great Britain; that was to say, taking it that the billet was the mere raw material for wire and dozens of other things, and taking the possible fuel consumption of finished sections, including plates and sheets right down to the wire, the consumption per ton on finished sections would be out of all proportion to the figures given in the paper. The paper referred simply to a self-contained works working under special conditions.

Demand for High-Temperature Coke

PROF. H. E. ARMSTRONG said that since 1885 very little progress had been made, and there had been no systematic research on the matter. The iron and steel industry had made the only real step forward in regard to the distillation of coal in producing coke for its use and in developing recovery plant. He called attention to the part the industry was going to play in providing materials which were so often spoken of in connection with the dyestuff industry. The substances which were required were high-temperature products. They were not to be got by low-temperature distillation. Wherever the iron and steel industry had coke ovens it ought to take on the gas industry. There ought not to be a gas works anywhere near a blast-furnace. From that point of view he thought that the development of high-temperature coke production was of very great importance. He only knew of one firm which had a separate fuel manager, namely, Crossfields of Warrington. They had a man whose sole duty was to go about the works and see how the coal was being used to the best advantage, and that had been a source of great economy to the firm.

Cleaning the Gas

H. M. RIDGE, London, said the papers had laid great stress on gas cleaning, and electrostatic cleaning had been put forward as the only workable means. He might mention that experiments were going on in other directions which might soon lead to a much cheaper form of apparatus for efficient gas cleaning.

He had come to the conclusion that it was undesirable to pass waste gases at 800 deg. C. or even 600 deg. C. to waste-heat boilers but to use them for pre-heating the secondary air of producer-fired open-hearth steel furnaces. It might appear that this would involve a radical alteration in British steel works, but it meant only a certain amount of addition to existing plants. By adopting such means he had been able, on a full-size plant, to reduce the temperature of the waste gases to 270 deg. C., and the whole of the heat units available, except a minute amount of radiation, were used for heating the secondary air. That alone had reduced fuel consumption from 150 tons to 80 tons, a saving of 46 per cent.

Utilizing Waste Heat

FRANK FOSTER mentioned that the ideal figure of 33 cwt. of fuel used per ton of finished sections had actually been obtained in 1913 in a German iron and steel works. That plant consisted of waste-heat non-regenerative coke ovens, blast furnaces, open hearth furnaces and electrically-driven rolling mills. There was no steam except for the blowing engines and a certain amount of heating for the offices, while electric current was generated by gas-engine-driven dynamos. Figures which he had showed a loss by radiation of something like one-third of the total heat available in open-hearth furnaces. By doubling the rate of driving this could be reduced, but not in proportion. At the same time a considerable fuel economy could be effected in this way.

W. H. PATCHELL, speaking with regard to gas engines, said that the gas engines were put in by men who had to deal with waste fuel. Instead of wasting their fuel they saved it and spent the money on gas engines and gained valuable experience.

Progress at Skinninggrove

ERNEST BURY, Skinninggrove Iron Co., Ltd., Carlin How, York, said the views expressed in the paper by Mr. Johns in regard to the application of waste gas for the development of the necessary power for heat required for the conversion of the pig iron into finished steel were generally in sympathy with the line of development at Skinninggrove where, owing to remoteness from the coalfields, fuel saving had always been a matter of crucial importance. On this account, his company decided to attempt to render the works self-contained from the fuel standpoint, i. e., the coal utilized for the manufacture of coke should suffice in the surplus gases obtained from the coke oven and blast furnaces, for the power and heat required to convert the entire make of iron into finished steel. To this end it was decided to adopt regenerative coke ovens, an entirely gas-engine developed power stations, electrical transmission throughout, and coke-oven gas-fired soaking pits. That was the present stage of development at the works, the substitution of gas blowing engines for the old steam blowing plant being left over for the time being. The first gas blowing engine would be started very shortly.

Up to the present, they had had to confine themselves to the utilization of the coke-oven gas only, there being little available blast-furnace gas unless efficient blowing plant, double bells or gas cleaning were employed. They had only been able to employ blast-furnace gas for power-house or steel-works use by substituting coke-oven gas for blast-furnace gas at the blowing engine boilers. Thus the steps taken towards the utilization of surplus gases up to now had lain directly or indirectly in the utilization of coke-oven gas only. With this gas alone they had been able to provide sufficient power for the whole of the works, in addition to heating and rolling off their make of ingots, which roughly had been equal to half the make of pig iron.

To complete the final program, namely, the conversion of the pig iron to steel ingots, and to deal with the increased make of the latter, they had commenced a gas blowing engine program, and were completing the erection of an electrostatic gas cleaning plant for dealing with the entire make of gas, the latter having been chosen in order that the sensible heat might be conserved in the combustion of the gas for stove purposes, and also on account of the lower power consumption in the gas-cleaning operation itself. With the completion of this program, it was calculated that their fuel policy would be about self-contained as between the coke ovens and blast furnaces and the finished steel.

Practice in Great Britain and in the Occupied Area

R. C. HARDING, Stoke-on-Trent, commenting on the paper by Mr. Cosmo Johns, said that much of the paper was on the economical use of blast-furnace gas, and rightly so since more than half the calorific value of the coke charged into the furnace appeared in the gas given off at the furnace top. The large volume of surplus blast-furnace gas was a noticeable feature in all

works in the Lorraine and Saar districts and a visitor instinctively drew comparisons with the practice generally obtaining in Great Britain. The total volume of gas produced per ton of pig iron was about the same.

The first point in gas economy in Germany was the invariable use of gas seals on the charging hoppers, even on hand-fired furnaces. He did not see a single furnace where any gas was lost when lowering the bell, and that point alone as compared with many of the hand-charged furnaces in Great Britain meant a saving of from 5 to 10 per cent in the total volume of gas given off. The gas consumption for blowing purposes alone in the German works visited was considerably less than half that consumed in Great Britain, where steam blowing engines were used.

Under the head of gas cleaning the authors stated that "it is this effective first cleaning of the gas before it was used in stoves or for boilers that rendered available such a large surplus for other services." Had they not overlooked the effect which the steel-making process found in the German works had on the available surplus of blast-furnace gas. If the Bessemer basic process was compared with the basic open hearth, working say 30 per cent of scrap in the charge, the relative weights of pig iron consumed per 100 tons of ingot output would be about 114 to 70.

In the case of works which included blast furnaces, the amount of surplus blast-furnace gas available would be directly proportional to the output of iron, other conditions being equal. It would therefore be seen that due to the greater usage of pig iron alone, the available surplus of blast-furnace gas would be about 63 per cent greater in the case of the Bessemer basic works than in the open-hearth plant using 30 per cent of scrap. That factor, together with the small amount of gas used for blowing purposes, would easily account for more than double the available surplus of blast-furnace gas usually found in a combined blast-furnace and open-hearth plant in Great Britain.

With regard to the use of cleaned gas for stoves, the authors stated that with cleaned gas flame temperatures were higher. The majority of the gas cleaning plants he saw in Lorraine were of the "wet" type, and the gas was delivered to the stove burners saturated with water vapor. How was it possible for the flame temperature to be higher under those circumstances than when using hot uncleaned gas at say 300 deg. to 400 deg. Fahr?

In the Saar district, the authors pointed out that all the four works visited used the Halberg-Beth dry cleaning process, and that one works used all Saar coal in their coke ovens. The opinion was unanimous in all the works visited that the Saar coke was very much inferior to Westphalian coke for blast-furnace purposes. One would therefore expect to find that the coke consumptions were high at the works where coke made from all Saar coal was used, more especially as those works were only equipped with 15 stoves for 6 furnaces and normally only worked two stoves per furnace. It was found that the coke consumption at this works was only 24 cwt. per ton of pig iron at the present time, and that the drop in the blast temperature when working two stoves was only 180 deg. Fahr. In other words, those works were getting as good blast temperatures with 2 stoves using dry cleaned gas, as others with four stoves and using gas wet cleaned.

The extended use of blast-furnace gas in steel works was looked forward to by the authors, but circumstances might well force economy in another direction. The first consideration must be the coke consumption per ton of pig iron. That meant a reduction in the temperatures drop allowable at the stoves, and higher average blast temperatures probably involving an increased gas consumption per ton of pig iron for stove purposes, while the resulting reduction in coke consumption would curtail the total volume of gas from the furnace. That reduction of the available surplus gas might be counterbalanced by the introduction of the Cottrell system of gas cleaning, and an improved efficiency in stove practice by the use of pressure burners with special devices for insuring thorough mixing of the gas and air together, with exhaust fans enabling lower temperatures in the waste gases to be carried.

National Founders Association Meeting

Individual Contracts, Associations of Employer and Employee, Use of Foreign Language Papers and Attitude of Organized Labor Discussed Last Week

OUTSTANDING impressions of the 1919 annual meeting of the National Founders' Association, held in New York last week—a meeting which, like other annual gatherings of this association, was conspicuous for the crystallizing of views on the labor problems of the day—carry the following thoughts: That profit may come from studying the workings of associations of employers and employees, such as has been established in Cleveland; that individual contracts with workmen are possible in large industrial institutions; that contrary to a too generally accepted notion a large percentage of the foreign language press is not radical, but should be supported where legitimate advertising can be proved worth while and that it should be utilized as an element to controvert insidious radical propaganda; that the American Federation of Labor is not warranted by the facts in so widely securing public approval of the claims of the organization's being conservative.

The meeting was held on Wednesday and Thursday morning, Nov. 19 and 20, at the Hotel Astor, New York. It was noteworthy for the large attendance, about 50 per cent of the total membership of 652 foundries being present; and no less than 65 per cent of the members of the alumni, the organization made up of past and present members of the administrative council, participated in a reunion Tuesday evening. Like other meetings a series of addresses by those qualified to discuss the subjects assigned made up the major part of the program, and the annual banquet was a feature on Wednesday night. Following is a review of the various addresses, together with the main points of the reports of the president, William H. Barr, and the commissioner, A. E. McClintock.

President Barr's Address

In his presidential address Mr. Barr referred to the Washington industrial conference. It was not permitted, he said, to touch upon production or increased efficiency. It was not permitted to indicate the present relationship between wages and cost of living. It was allowed only to consider the question of a national closed shop, and failing to approve, the conference was dissolved because the labor representatives refused to go further.

Conditions in most open foundries, he added, are all that humanitarianism could rightfully expect. This is not so true in closed union foundries, where the limitation of output, always practised, cuts to a minimum the earnings of the owner, making it difficult to finance modern manufacturing improvements. A little earlier in his address he mentioned that 5800 strikes were called by the labor unions during the war and no strikes whatever occurred in non-union shops.

In touching on the matter of employee representation, he contended that more strikes are caused by the ill-advised conclusions or the hasty words of a foreman than through any other single cause. "With this possibility reduced to the minimum, by means of periodical meetings of foremen, discussion of policy, analysis of production plans and the emphasizing of the necessity for a square deal for all employees, it is my opinion that the employees who look to their management and its staff for constructive leadership will, when not influenced by radical agitators, find profit and happiness in their daily work."

Commissioner McClintock's Report

Mr. McClintock in his report held it to be one of the big advantages resulting from union labor's attack on the steel industry that public attention has been focused on the basic and fundamental principle of the open shop. "The right of the workman to individual contract, the right to work without membership in a union, has

received more publicity than ever before. It is well to keep in mind that the success of the open shop has been due to its being made a better place to work than a union shop; a place where a workman, free from union restrictions, can co-operate with his employer, and by the use of modern equipment and improved methods be able to increase production and likewise increase his earnings."

He touched on the scarcity of journeymen molders. Few shops, he said, can be found that are training a full complement of boys under the old-fashioned apprentice method. "The reason is that it is getting impossible to obtain a sufficient number of boys willing to take a four years' apprentice course. They prefer other work where the immediate pay is better. The result is that the foundry industry, while making headway in breaking in laborers to become molding machine operators, is making but few molders. Some of our members are meeting this problem by keeping in their employ one or more molders' instructors, whose duty it is to take direct supervision of the new recruits and give them intensive training. When not engaged with newcomers the instructor is assisting in improving the skill and upgrading those previously employed. The success of this plan depends on selecting young men who are interested in learning a trade and willing to start at the hourly rates paid unskilled laborers. Placing them under the direct supervision of an instructor, their enthusiasm is kept up, and they can see early possibilities of improving their skill and likewise increasing their earnings."

"It is my opinion that the lack of satisfactory results in obtaining and holding a desirable class of young men on the part of some firms is that they have attempted to place the work of instructing upon their regular foundry foreman, who, in the majority of instances, is already fully occupied with general supervision of the shop, and is unable to give the necessary attention to the newcomer. He, after a few days' experience, gets discouraged and drops out."

Industrial Unrest Discussed

George F. Monaghan, Detroit, counsel for the association, delivered an address on "Industrial Unrest." He paid a tribute to the prompt action taken by Attorney General Palmer in the coal strike and mentioned the efforts of General Leonard Wood in restoring order in the steel district at Gary, Ind.

Causes of the present industrial unrest are to be found, Mr. Monaghan believes, in lack of production; the present extravagance of all classes, but particularly those who heretofore have not been addicted to reckless spending; socialistic agitation and profiteering on the part of both capital and labor. Discussing the industrial conference at Washington, he said that no agreement should be reached on collective bargaining until a bargain with labor is really a bargain and not a one-sided affair. He condemned the American Federation of Labor for endorsing strikes which had been called in violation of contracts.

The employment of more efficient machinery and equipment and greater efficiency in management were two suggestions made by the speaker for the solution of present difficulties. Another suggestion was that both employer and employee agree to adopt the present scale of wages and present profits until greater production can bring down the cost of living to somewhere near the normal level. He suggested that any employer who seeks in every way to get the last nickel in a wholly selfish fashion is an enemy to his class and to his country.

A Duty of the Efficient Manufacturer

Speaking of manufacturers who are so efficient in the matter of their manufacturing organizations that

in a few hours daily they can dispatch the business necessary to keep their plants running, he charged that such should be devoting a part of their surplus time to assist those institutions in their own cities which are wrestling with the Americanization problem, or, for that matter, general social problems. The average employer, he said, would be worsted in 15 min. in a discussion on social matters with representatives of the employee class. He urged the need of such activities, because the propaganda of unrest is in the hands of men of no mean ability. He took occasion to refer to a number of periodicals of considerable reputation which are printing the insidious doctrines without contradiction.

He also called attention to the rather prevalent notion that the American Federation of Labor is a conservative organization and therefore the less of the evils confronting us, but he insisted that the American Federation of Labor is merely the prelude of sovietism in the United States. Mr. Gompers, he reminded his audience, has been upholding Foster of the steel strike and Lewis of the coal strike, and harked back to the defiant attitude of the law taken by Mr. Gompers in the case of Buck's Stove & Range case some years ago, having indeed never served his sentence for contempt of court. As illustrative of the activity of those striving to bring about soviet rule, he mentioned that in Detroit, for example, ten Bolshevik meetings are being held daily, some attended by as many as 5000. He deplored the degree of laxity on the part of right thinking people. "I pray," said he in conclusion, "that there may be no political division in the United States over the vigorous stand of the Administration in the case of the threatened coal strike. When all come to the conclusion that all is not for profit and make sacrifices, so long as they are not sacrifices of principle, we can have confidence in the result."

Government Competition in Industry

William H. Vandervoort, president Root & Vandervoort Engineering Co., Moline, Ill., addressed the meeting on "Government Competition in Industry," discussing the Rock Island Arsenal management, which has been referred to several times in THE IRON AGE. He called attention to the fact that the workers get a month's vacation; that there is a committee representing the workmen in Washington engaged in getting business from other departments of the Government as well as the War Department; that the shops are run on the basis of attempting no profit; that though there is a \$35,000,000 investment at the Rock Island Arsenal no depreciation charges are figured in settling on manufacturing prices, and that, indeed, materials on hand purchased at higher levels have been reduced in inventory values by a board of officers, thus to put the arsenal in a better position to make a more reasonable bid. As it is, it happens that the overhead carried against the foundry is 300 per cent and against the machine shops 200 per cent. The system under which the arsenal is operated appears to make it embarrassing to develop a profit, as the officer in charge would not know what to do with it. Mr. Vandervoort added that there seems to be no intention on the part of the operatives to give up the month's vacation either to increase production or reduce cost.

In touching on the subject of unrest, Mr. Vandervoort emphasized the importance of maintaining closest possible individual relations between the management and the men, and as this involved in the large plant the delegation of the owner's interest in an individual workman's well-being, it was all important that the delegation of representation should be made wisely, or, in other words, that superintendents and foremen should be the results of unusually careful selection.

British and American Labor Problems

British and American labor problems were compared by Prof. J. Laurence Laughlin, economic advisor National Industrial Conference Board, in an address which also sounded a leading sentiment of the meeting that there is need for combatting actively the preaching of socialistic teachings and for divesting the American Federation of Labor of the conservative attitude which

is rather generally accepted in the public prints as typifying the stand of this labor organization.

In referring to the British labor, Professor Laughlin described leaders there as superior in the matter of general culture to those in the United States. Though there labor is quite homogeneous and highly organized, the more advanced character of their demands is conspicuous. There is, however, a widespread inbred respect for law and order, but for all the spirit on both sides of the Atlantic is about the same. Large numbers are opposed to extreme measures, but there remains a widespread ferment against the existing industrial system and a desire to get somehow luxury and leisure galore. The government has become much involved, growing out of war demands partly, and thus, he said, politics have entered into what is purely an economic subject. It is a short step, he added, from government ownership to destruction of the government.

The thing which has not been thoroughly appreciated either here or there is the extent to which industries are interdependent. Just as an aroused public spirit there succeeded in breaking a strike against the triple alliance of railroad, mining and dock yard workers, the sequel may be expected here in the attempt to force extensive demands for miners and to foist the Plumb plan of railroad control on this country. "If the attempt is made the movement will strike the rocks here as it did in Great Britain." There has been, he added, too general an idea that the union is stronger than the government, union orders being obeyed against those of the government. "Here we have too many covenants made by politicians as particularized in the spectacle of wage fixing under the Adamson bill." A reassuring fact to which attention has not been called, he continued, is the credit which must be given to the large numbers of workmen in Massachusetts who helped to give the majority to re-elect Governor Coolidge.

Foreign Language Press

The question of foreign language newspapers was discussed by Richard H. Waldo, manager Inter-Racial Council. His particular plea was for a new judgment of the position of the foreign language papers. He admitted that 3 to 5 per cent were radical and 10 to 15 per cent socialistic, and that thus at the outside under a licensing system 20 per cent might be suppressed. The remainder were decidedly conservative. The figure of the foreign papers which might come under the indictment is not large when it is recalled that fully 10 to 15 per cent of the shops of the country could not be defended, or, in other words, are as bad in the matter of human relations and working conditions as the labor agitator claims. In both cases the one example is made much of.

He made a plea for taking advantage of the strong force for conservatism which we had in this large group of foreign language papers, reaching upward of eight millions of people, and announced to the meeting that President Barr had agreed to become managing director of his organization. Mr. Barr, in commenting on the arrangements, explained that it was hoped to develop effective plans to help support this means of reaching foreign workers.

James A. Emery, who acknowledged at the outset of his address his election to honorary membership in the alumni of the association, the organization made up of past and present members of the administrative council, told the story of the Washington Industrial Conference. He was an observer as counsel of the National Council for Industrial Defense. He referred also to figures given out by the Assistant Secretary of Labor, admittedly incomplete, in which it is shown that there were upward of 6000 strikes in this country from April 6, 1917, to Nov. 11, 1918, entailing an average loss of 17 days. He added that in November, 1917, the number of labor days lost in the United States, that is the number of strikes multiplied by the number of persons involved, was four times the number in 1916 in the German Empire for a similar cause. In referring to the possibility of establishing personal relations, he estimated that in not more than 15 per cent of the 300,000 manufacturing plants would it be impossible to maintain such relations.

The Industrial Association of Cleveland

"To grow more you must know more; to earn more you must learn more." This is the motto of the Industrial Association of Cleveland, described at the session on the morning of Nov. 20 by H. P. Bope, vice-president Hydraulic Pressed Steel Co. of that city. As explained on the printed program, this association is "an alliance of employers and employees—a possible cure for the present industrial unrest." The speaker told the story of the association as follows:

"About five years ago ten of us got together to see how we could benefit our factory. First we realized the necessity to educate our foremen. Then we believed such a movement should not be confined to one factory, so we called together 50 leading business men of Cleveland and secured that number of members to form the association. There are 30,000 salaried employees in Cleveland and it was for their advancement as well as that of the employers that the movement was launched. A board of directors was formed, consisting of 25 employers and the same number of employees.

"We inaugurated monthly meetings with speakers and movies, a typical instance of the latter being a presentation of the manufacture of steel from the mining of the ore to the finishing of the steel product. Eight hundred men saw these pictures monthly. Last year in 20 meetings there was an average attendance of 1100 men—employers, superintendents and workmen.

To protect the liberty and independence of employer and employees and establish relations of mutual confidence and respect.

To secure free exercise by employer and employees of their natural and constitutional rights as American citizens.

To promote individual initiative and ambition.

To remove the causes of injustice in the shops, should they arise.

To maintain as far as possible a regular income for employees by uninterrupted operation of shops.

To secure a regular and dependable force of employees essential to the operation of shops and the preservation of company property.

The following agreement is made between

WATERLOO GASOLINE ENGINE COMPANY

and

Employee

The Company Agrees:

1. To pay _____ cents for every hour worked, or the piece work prices _____

2. To furnish employment as steadily as business and trade conditions permit.

3. Not to reduce the rate of wages per hour or the piece work prices during the life of this contract.

4. To comply with the principles and rules of the Company as printed and posted in the shops and pay one-quarter of the cost of Sick Benefit Fund.

5. To pay compensation for all injuries received while in the Company's employ, in accordance with the Iowa Employers' Liability Law.

WATERLOO GASOLINE ENGINE CO.

Per _____

State of Iowa
County of Blackhawk

Before me appeared _____

and acknowledged that he executed the foregoing contract as his free and voluntary act and deed on the day and year last above written.

My commission expires _____

Form of Contract Between Employer and Individual Employee Offered Even for Large Plants

The object was to bring together the brains and the brawn and to distribute some of the brains into the brawn. The speeches were usually about 20 min. long and were followed by an open forum. Cleveland is 500 per cent better off because of the industrial association.

"The foremen were broadened by mingling with the foremen of other shops and exchanging ideas and viewpoints. We have a magazine called 'Co-operation,' which is very helpful in promoting friendly relations and affording education. We do not believe in unions—they are horizontal, whereas they should be vertical, or take in the executives and be local in their scope. We offset red propaganda by employing the vernacular of the laboring man in presenting economical truths about red fallacies."

Here the speaker read an extract from "Co-operation," in which two mythical Irishmen discussed the theory of cutting in two the working day in order to give jobs to twice as many workingmen, the conversation gradually pointing out the absurdities of this proposition.

"Similar associations," Mr. Bope continued, "have been started in Philadelphia and St. Louis, and there is a movement on foot in Detroit to form one. We ought to be able to build up a national association which would go far toward solving the labor problems of the day. Our association hits as hard at the mistakes of the employer as at those of the workman. Associations of our kind are apt to put a 90 per cent emphasis upon welfare work and only 10 per cent on production; with others, the percentages are reversed. We try to proportion attention on a '50-50 basis.'

"I am convinced that the American worker is the soundest thinker of any nationality in the country. I am convinced that by getting his viewpoint and giving him the employer's, as the Cleveland Industrial Association strives to do, much labor trouble will be eliminated. I think Cleveland is ahead of any city in the country to-day as regards human relations in industry."

The Individual Contract

How an entire community was converted from one of strong union sympathy to that for an open shop was told in a forceful manner by L. R. Clausen, Deere & Co., Moline, Ill. His striking ways of presenting his arguments brought forth hearty hand-claps and laughter of approval. His subject was "The Right of Individual Contract."

He told briefly of the Deere company, with its 14 factories and the recently acquired Waterloo Gasoline Engine Co., Waterloo, Iowa. He commented on the industrial conference at Washington. Upon a blackboard he listed the rights which the Constitution of the United States confers upon each citizen, placing in the first column the following: Life, liberty, to pursue happiness, to work, to get just returns from work, to bargain individually and to organize to bargain collectively. However, as soon as he chooses the last, to organize for collective bargaining, he sacrifices everything, Mr. Clausen insists, except the first and last, or to live and bargain collectively, or, as he suggested, it might be put "to organize and collect."

Mr. Clausen next gave the history of strikes this summer at Waterloo and their final failure. Each workman now is given an individual contract and a memorandum with 20 points in favor of it, as opposed to unionism and collective bargaining. The twentieth point is to the effect that all men are advanced through their own efforts. Not even Gompers, said he, got ahead by collective bargaining. The men are asked to take this literature home, to read it carefully to their wives. They are agreed that the individual contract is the better policy. A copy of the contract is here reproduced and following is the memorandum.

Memorandum Accompanying Individual Contract

It is desirable that the employee understand the advantages of the individual contract thoroughly when he makes the contract, so that he will not be influenced by agitators and others who have ulterior motives in trying to force a wedge between him and his employer. The individual contract has the following advantages:

1.—It stabilizes the job for the employees, as it guarantees to him wages and conditions for a definite period.

2.—It preserves to the employee his natural and constitutional right.

- (a) To liberty.
- (b) Pursuit of happiness.
- (c) To come and go.
- (d) To work and not to work.
- (e) To make his own contract.
- (f) To secure greater returns for greater effort,

all of which are of vital importance to him, and which are restricted or entirely removed under collective bargaining.

3.—It protects the employees from the domination and dictation of third parties, walking delegates, etc., who attempt and often do determine where, when, for whom the individual shall work—for how long and for how much. This is a form of economic serfdom and a restriction of inherent constitutional rights of the American citizen which is absolutely unsound, and which the individual contract helps to preserve him from.

4.—It puts the relations of the employer and employee upon a high plane of mutual confidence and respect, which is the only stable relation that can exist in industry. It is a moral obligation by which each is individually bound.

5.—It brings the employer and employee closer together, which is essential to common understanding and pleasant relationship.

6.—It promotes a feeling of independence and self-confidence in the employee, which is merican in spirit through and through.

7.—It stimulates the ambition and initiative of the individual, and therefore leads to a happier life.

8.—It promotes individuality and emphasizes the individual man. It removes the deadening influence of collective grouping and bargaining.

9.—It recognizes the individual as the unit in industrial life. Thinking of, or dealing with men in groups or classes is foreign to our best American ideals. In this respect it affects both employer and employee. It is as bad for the employer to think of his organization as so many blacksmiths, so many machinists, and so many grinders, instead of John Smith, Bill Jones and Joe Brown, as it is for Bill Jones to think of himself as a member of the machinists' union instead of as Bill Jones individually.

10.—It provides a definite time and means for employer and employee to discuss wages and shop conditions, etc., which affect that particular man in his particular job.

11.—It opens the way to the advancement of the individual.

12.—It removes the restrictions existing in collective bargaining or grouping.

13.—It adds dignity to industrial work, which is too often looked upon only as a job that has no length and very little breadth.

14.—It places responsibility on the management. In industrial relations as well as in other business relations success is pretty well measured by the degree in which you meet the terms of your contract.

15.—It places a definite responsibility on the man. Every one has a deep-seated respect for his word.

16.—It is economically sound because it is in the direction of proper reward for proper effort. Every man's reward should be in direct accordance with his production and with his economic service. The employer and employee together are the best judges of the proper reward for his service. There are no others who can so correctly decide this question.

17.—It is in accordance with natural law. Nature rewards every man in accordance with his ability and effort. Any disregard or violation of this law is bound to react against the violator and the community in time.

18.—The general public respects contracts and gives little support to men or institutions who fail to live up to them. This is very desirable from every standpoint.

19.—Our particular form of contract is good and sound because it obligates the employer equally with the employee.

20.—The fact that all men who have made a success in life have advanced through their own individual initiative, ambition and effort and by individual bargaining, and there are no successful men who have been advanced in life by collective bargaining is sufficient evidence that the employee and the employer do bargain on an equal basis when they bargain individually man with man. The only exceptions to this are the few labor leaders and agitators who have made a personal profit by exploiting and using the workmen as tools for their purpose.

In its office the company has a card for each workman, on which is recorded his weekly wages. When the record shows a sudden drop in wages or failure to advance, the case is investigated.

The association passed a resolution pledging to assist the Government in its efforts to suppress sedition and disorder and expressing a debt of gratitude to A. Mitchell Palmer, Attorney General of the United States, for his courageous action in defense of American principles.

J. H. Schwacke, William Sellers & Co., Inc., Philadelphia, explained the making of a peculiar casting on exhibition before the convention. Pictures of similar ones made by Alexander E. Outerbridge, Jr., metallurgist of the company, appeared in THE IRON AGE of Nov. 13 and Dec. 25, 1913. The casting resembled a miniature Christmas tree, the resemblance being accentuated by the coating of green paint given it for preservation. It was nearly two feet high and nine inches in diameter at the base. It was made by pouring molten iron into a nail keg previously filled with broken charcoal. Its fragility was demonstrated by the several "twigs" which broke off in transit from Philadelphia. After the convention the casting was presented by Mr. Schwacke to THE IRON AGE, in whose offices it remains on exhibition.

Service Program of Equipment Makers

Franklin G. Smith, Cleveland Osborn Mfg. Co., and vice-president Foundry Equipment Manufacturers' Association, told the meeting how his association was going to undertake with the co-operation of the founders to place in the hands of workmen bulletins to help them operate and care for modern equipment and "thus to get 100 per cent for the money spent for the equipment." In the immediate future requests will be sent to foundries for the residence addresses of superintendents and foremen and of others designated, so these bulletins will go directly into the hands of the men concerned. A binder for loose leaf monthly bulletins will be provided. He quoted President Minich of his association as expressing their stand briefly as this: If any manufacturer of foundry machinery has produced

equipment in which he has not perfect confidence, he will withdraw it from the market. "We have," said Mr. Smith, "the courage to take that stand." It was mentioned that there are 1500 foundries in the country, exclusive of railroad shops, that are regarded as of good standing, leaving 3500 that were referred to as hardly worth while.

Canadian Foundrymen Form Association

Melville P. White, Canadian Allis-Chalmers, Ltd., Toronto, Can., told of the strike of foundry workers in Toronto and the resulting formation of employers' associations. The strike started May 1 and embraced all lines of metal workers, following very drastic demands. At one time a general strike was threatened. Practically all the foundries in Toronto are now running with non-union men and the strike is beaten. In Ontario there are 300 foundries altogether. A convention was held in September with 35 members joining the Ontario Founders Association the first night. The association now has 70 members. Letters have been received asking that it be made a national organization, to be called the Canadian Founders Association.

Officers and District Committees

William H. Barr, Lumen Bearing Co., Buffalo, was re-elected president; he was described by H. P. Macdonald of the nominating committee as "a gentleman unafraid." Julius Goslin, Joubert & Goslin Machine & Foundry Co., Birmingham, Ala., was chosen vice-president. The Chicago Trust Co. was again chosen treasurer, and J. M. Taylor, Chicago, secretary.

First District: Enoch Shenton, Wm. Highton & Sons Co., Nashua, N. H., chairman; C. C. Chesney, General Electric Co., Pittsfield, Mass., vice-chairman; Charles L. Taylor, Taylor & Fenn Co., Hartford; H. B. Johnson, General Fire Extinguisher Co., Providence; Fred F. Stockwell, Barbour-Stockwell Co., Cambridgeport, Mass.

Second District: H. P. Macdonald, Sneed & Co. Iron Works, Jersey City, chairman; Louis P. Willsea, Willsea Works, Rochester, N. Y., vice-chairman; Geo. C. Forgeot, Worthington Pump & Machinery Corporation, Buffalo; James Eastwood, Benjamin Eastwood Co., Paterson, N. J.; W. H. Thomas, Straight-Line Engine Co., Syracuse, N. Y.

Third District: J. Turner Moore, Reading Steel Casting Co., Reading, Pa., chairman; Alex. Jarecki, Jarecki Mfg. Co., Erie, Pa., vice-chairman; J. P. Allen, Union Steel Casting Co., Pittsburgh; Chas. W. Asbury, Enterprise Mfg. Co. of Pennsylvania, Philadelphia; David Boies, Spencer Heater Co., Scranton, Pa.

Fourth District: Samuel Blackburn, John B. Morris Foundry Co., Cincinnati, chairman; C. W. Russell, Russell Wheel & Foundry Co., Detroit, Mich., vice-chairman; Wm. M. Taylor, Chandler & Taylor Co., Indianapolis; J. M. Bashline, Starr Drilling Machine Co., Akron, Ohio; I. A. Wyant, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Fifth District: John B. Strauch, More-Jones Brass & Metal Co., St. Louis, chairman; A. H. Head, Waterloo Gasoline Engine Co., Waterloo, Iowa, vice-chairman; C. C. Cole, United Iron Works Co., Kansas City, Mo.; F. E. Place, Buda Co., Harvey, Ill.; Horace R. Culling, Carondelet Foundry Co., St. Louis.

Sixth District: Fred M. Prescott, Prescott Co., Menominee, Mich., chairman; John G. Osborne, Lakeside Malleable Castings Co., Racine, Wis., vice-chairman; L. R. Barrett, Vulcan Iron Works, Winnipeg, Can.; Oliver Crosby, American Hoist & Derrick Co., St. Paul; F. L. Silyer, Silyer Steel Casting Co., Milwaukee.

Seventh District: H. Cockshutt, Cockshutt Flow Co., Brantford, Ont., chairman; W. M. Gartshore, McClary Mfg. Co., London, Ont., vice-chairman; E. H. Jones, Canadian Allis-Chalmers Co., Toronto, Ont.; C. L. Jobb, Canada Iron Foundries, Ltd., Montreal.

Eighth District: Z. W. Wheland, Wheland Co., Chattanooga, Tenn., chairman; W. S. Mosher, Mosher Mfg. Co., Dallas, Tex., vice-chairman; W. D. Tynes, Hardie-Tynes Mfg. Co., Birmingham; L. J. Black, Beaumont Iron Works Co., Beaumont, Tex.; Geo. M. Morrow, Jr., Birmingham Machine & Foundry Co., Birmingham.

Merger of Cleveland and Detroit Companies

The Republic Tool & Mfg. Co., Cleveland, has been formed through a merger of the Cleveland Power Transmission Co., the Diamond Stamping Works, the Clyde E. Lowe Co. of Cleveland, and the Detroit Reamer & Tool Co. of Detroit. The company will have \$500,000 capital stock divided into 5,000 shares of 7 per cent cumulative preferred stock of \$100 par value and 15,000 shares of no-par common stock. Basic patents on pressed steel cores and steel mandrels have been acquired from the Clyde E. Lowe Co. and plans have been prepared for increasing the capacity of the Diamond Stamping Works. Executive officers of the new company are: Clyde E. Lowe, president; B. V. Selby, vice-president; E. H. Krueger, secretary; E. E. Lenarz, treasurer and general manager.

Foundry Week in Philadelphia

Annual Meeting of the American Foundrymen's Association and the Annual Exhibition of Foundry Equipment, Machinery and Supplies

FOUNDRY week in Philadelphia, the six days beginning Sept. 29, was all that was expected and, to express it colloquially, a good deal more. Owing to the strike which befell New York business publications that same week, no adequate printing facilities have been available since to tell the story, and now a revision of the original plan becomes necessary. In earlier issues has been outlined the comprehensive program of technical discussions of both ferrous and nonferrous foundry practice that had been provided and some forecast was made of the exhibition that was held of foundry and metal working equipment and supplies, of machine shop supplies and of machine tools and accessories. In succeeding issues will be given reviews of the different technical papers, and also of the discussions, submitted at the various sessions of the American Foundrymen's Association and of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers. The following will thus amount to an account of the general meetings and of the exhibition:

Casting Production Here and Abroad

At the first session of the American Foundrymen's Association, held Sept. 30 in the ballroom of the Bellevue-Stratford Hotel, President A. O. Backert presented the annual presidential address. He discussed, among other things, the underlying causes for the differences in the rates of production in the foundries of the United Kingdom and the United States. The wide divergence in the standards of the casting buyers of the two countries is, he said, one of the underlying reasons. "The insistence upon high quality and superfine finish are two requirements that slow-up production abroad. The widespread use of dry sand molds in the United Kingdom and also in France, to provide the necessary finish demanded by the trade, is a large factor in reducing the per capita output. Quality and finish have been carried to the extreme and at the sacrifice of quantity. In the shops in this country, on the contrary, green sand practice prevails and quantity production is the goal to be attained, frequently at the expense of finish and quality. That a happy medium between the extremes of quality and quantity would serve the purpose cannot be denied, but years of education in one direction cannot be diverted to another course without an equal amount of training."

Repetition Work

Repetition work in this country is one of the factors underlying large production, he continued, and it lends itself admirably to the application of all kinds of mechanical and labor-saving devices. "With us it is not unusual to make 50,000 castings from the same pattern and in the automobile trade this total frequently is exceeded. Dealing in large numbers of the same unit enables the American foundryman to equip for quantity production and he requisitions for his use the most modern mechanical devices available to increase output and reduce cost."

"To the comparative lack of repetition work in both the United Kingdom and France must be assigned the prevalence of the jobbing shop and the large number of small foundries, willing, even if not equipped for the production of castings in iron, brass or steel. However, this semijob work is not without its compensating features. It has a tendency to develop skilled molders, whereas our specialty shops train men to one operation, not one of whom could make a parting or cut a gate by hand. Yet notwithstanding these handicaps, the mechanical equipment of many of the foundries of the United Kingdom and France measure up to the best practice prevailing in this country."

Steel Casting Manufacture

Steel casting manufacture in the United Kingdom, Mr. Backert continued, was greatly accelerated by the war. The output in 1918 totaled 276,518 tons, of which basic steel was only 10,564 tons as compared with 265,954 tons of acid castings. This tremendous predominance of acid over basic steel, which is in striking contrast to the practice prevailing in this country, must be attributed, to a very large extent to the insistence of the army and navy ordnance departments for castings made by the acid in preference to the basic process and also, in a measure, to the available ores. The war also speeded the installation of electric furnaces for the production of steel for castings. At the time of the armistice, 37 were in operation in foundries with an actual output of more than 5000 tons per month and 11 additional were being installed which will increase the actual production to 7000 tons per month.

When the war was terminated, electric steel casting production was at its height in the United Kingdom, as indicated by the output of 46,637 tons in 1918 and compared with 108,296 tons for the United States in the same period. Of the total steel casting output of the United Kingdom in 1918, the electric process accounted for 17 per cent against 7.7 per cent for the United States, indicating a production in proportion to the total steel casting output more than twice as great as that of this country.

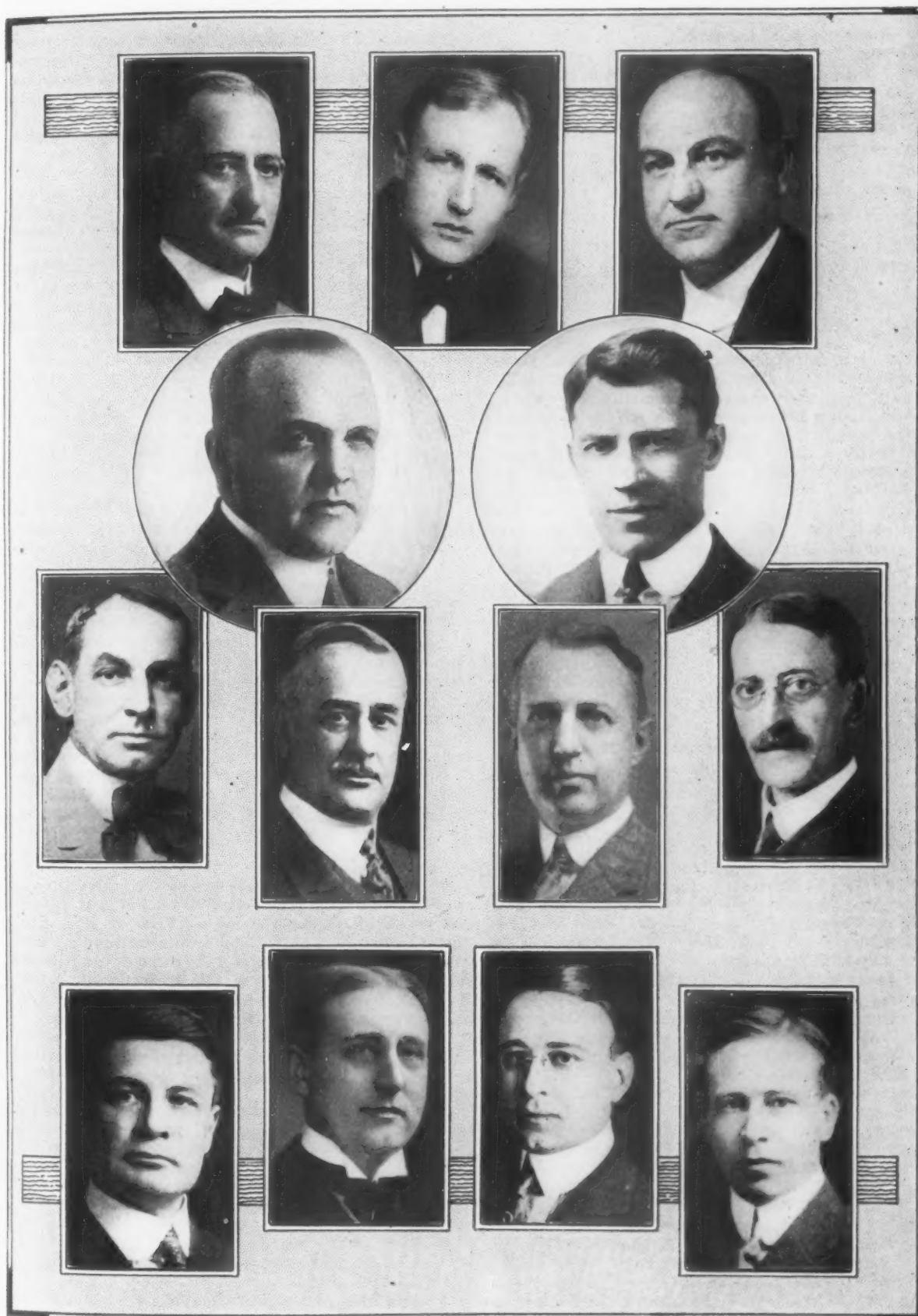
Converter Process Predominates

A further analysis of the steel casting statistics for both countries in 1918 reveal striking differences in practice. Steel for casting purposes made in converters in the United Kingdom exceeded open-hearth production by 1936 tons, the former having totalled 116,231 tons against 113,630 tons for the latter. In the United States, on the contrary, where the open-hearth process predominates, the production of converter steel last year was 160,844 tons as compared with 1,140,830 tons of open-hearth steel. In the United Kingdom converter steel represents 42 per cent of the output as contrasted with 11.3 per cent in this country and open-hearth only 41 per cent against 80 per cent in the United States. Among the converter processes employed in the United Kingdom the Tropenas leads with 53,633 tons; the ordinary side-blow process is second with 48,858 tons and the Stock, oil-fired converter is third with 13,075 tons. Classified as basic converter steel is 665 tons. No records are available of the production of steel castings by the crucible process in the United Kingdom and statistics of last year's output in the United States indicates also that this process is passing in this country. Statistics of the steel casting production of the United Kingdom and the United States for 1918, follow:

Analysis of Steel Casting Output, United Kingdom and United States, 1918, in Tons

	United Kingdom	United States
Acid open-hearth	103,731	634,950
Basic open-hearth	9,899	505,380
Converter	116,231	160,844
Electric	46,657	108,296
Crucible		1,330
Miscellaneous		110
Total	276,518	1,411,410

In many of the English plants the combined installations of cupolas and converters are unique. For the purpose of eliminating the handling of the metal in ladles from the cupolas to the converters, the melting furnaces are located on platforms at a considerable height above the floor level to permit of tapping the iron direct from the cupola spout into the mouth of the converter. Troughs are provided for directing the



OFFICERS AND DIRECTORS OF THE AMERICAN FOUNDRYMEN'S ASSOCIATION

In the two larger circles, left to right, are portraits of A. O. Backert, Penton Publishing Co., president of the association last year, and C. E. Hoyt, secretary-treasurer

In the top row, left to right, are: J. P. Pero, Missouri Malleable Iron Co., a director; W. A. Janssen, American Steel Foundries, vice-president of the association, and H. A. Carpenter, General Fire Extinguisher Co., a director

In the third row, left to right, are: A. E. Howell, Phillips & Buttorff Mfg. Co., a director; S. T. Johnston, S. Obermayer Co., a director; W. R. Bean, Eastern Malleable Iron Works, a director, and R. A. Bull, Duquesne Steel Foundry Co., a director

In the bottom row, left to right, are V. E. Misch, American Foundry Equipment Co., a director; H. R. Atwater, Cleveland Osborn Mfg. Co., a director; C. R. Messinger, Siver Steel Casting Co., a director, and C. S. Koch, Fort Pitt Steel Castings Co., the new president

metal into the mouth of either converter, one being located on either side of the cupola.

Following the curtailment of ordnance buying and the cancellation of existing contracts in November last year, many electric furnaces in steel foundries were shut down and the production this year will show a material decline in the United Kingdom. This is due to the high cost of manufacturing this grade of steel and the comparatively limited demand for electric steel castings for commercial purposes.

Work of the Association

During the year your association established a home of its own in commodious offices in the city of Chicago. With a secretary and a competent organization that can devote all of its time and energy to association affairs, its accelerated growth and increased usefulness and influence is assured. While the membership has increased at a normal average rate during the year, the enrollment is representative of not more than 25 per cent of those entitled to affiliation with this society.

Before closing I wish to recall to you the great loss which our organization sustained in the death of Major Jos. T. Speer, on Jan. 5, this year. Since his affiliation with us many years ago, no task was too great and no duty too trivial, which he did not perform cheerfully and well in our behalf. His ability and devotion were recognized by his election to the presidency for two terms in 1912 and 1913, and since that time he served as a member of our board of directors until failing health caused him to decline re-election.

The report of Secretary-Treasurer C. E. Hoyt, which the members had before them in printed form, stated that the association has a membership of 1103, and that 131 new members had been received in the year, 122 of whom are active and 9 associate. The finances of the association were shown to be in a flourishing condition.

Work of Foundry Equipment Manufacturers

Franklin G. Smith, of the Foundry Equipment Manufacturers' Association, told the members of the activities of that body, the purpose being to encourage the use of molding machines, etc. If it was found, on investigation, that a machine was not being used or not being used to the best advantage, the association endeavored to show the error being made. The idea is to assist the industry generally on the principle that helping one helps all, if the efficacy of well-designed machines is demonstrated. If a design is faulty it is sought to correct the trouble.

The cost committee reported at the general session Wednesday morning recommending that the details of the American Foundrymen's Association standard cost system should be published in the proceedings and also should be made available in pamphlet form. A resolution authorizing this step was adopted.

Officers and directors were elected as follows:

President, C. S. Koch, Fort Pitt Steel Castings Co., McKeesport, Pa.; vice-president, W. R. Bean, Eastern Malleable Iron Works, Naugatuck, Conn.; secretary-treasurer, C. E. Hoyt, Chicago; Board of Directors: H. R. Atwater, Cleveland Osborn Mfg. Co., Cleveland; W. R. Bean; R. A. Bull, Duquesne Steel Foundry Co., Coraopolis, Pa.; H. A. Carpenter, General Fire Extinguisher Co., Providence, R. I.; A. E. Howell, Phillips & Buttorff Mfg. Co., Nashville, Tenn; S. T. Johnston, S. Obermayer Co., Chicago; C. R. Messinger, Sivy Steel Casting Co., Milwaukee; V. E. Minich, Sand Mixing Machine Co., New York; J. P. Pero, Missouri Malleable Iron Co., East St. Louis, Ill.; J. Roy Tanner, Pittsburgh Valve Foundry & Construction Co., Pittsburgh; S. B. Chadsey, Massey-Harris Co., Ltd., Toronto; A. B. Root Jr., Hunt-Spiller Mfg. Corp., Boston.

The Banquet

The outstanding feature of the banquet, Thursday evening, Oct. 2, at the Bellevue-Stratford Hotel, was an address by James M. Beck, former assistant attorney general of the United States, and counsel in the Danbury-Hatters' and Bucks' Stove & Range Co. cases. He said the great danger confronting this nation today is not from without but from within, that it comes

from machinery not made of iron and steel, but of organization and the application of what is termed "direct action" by unprincipled labor leaders. He pictured the very constitution in peril, and aroused his hearers to enthusiasm in saying:

"The greatest service we can render to ourselves or to our allies of the war is to solve this problem of industrial unrest.

"I would solve it by enforcing the laws now upon our statute books. And I would add to these laws a new one which would say that if any combination of either employers or employees should attempt to subvert this Government by saying to it 'you will give us our demands or we will starve your women and children,' would be guilty of a seditious act and must suffer the penalties with which such an act is punishable."

A. O. Backert, retiring president, presided at the dinner introducing Sir Ellis W. Hume-Williams, M.P., representing Great Britain; Dr. Marcel Knecht, member French High Commission, representing the French Government, and Major R. A. Bull, Duquesne Steel Casting Co., whose subject was "Our Hosts." Mr. Backert also presented to the convention the new president, C. S. Koch, the new vice-president, W. R. Bean, and C. E. Hoyt, general manager and treasurer of the association.

Sir Ellis said the world must be rebuilt and that the Anglo-Saxon race must perform the task. He made a plea for industrial peace, saying among other things that if capital refuses to come forth, if labor's demands become excessive and production becomes affected then labor is on the high road to disaster. A coalition of Anglo-Saxon peoples is needed to meet the situation. He pointed out that while defeat in the recent war would have brought its burdens and sorrows, victory has brought its responsibilities.

Dr. Knecht in a patriotic speech said that business is not a "dead matter—it is a relation between living beings." He emphasized that different nations have their views and racial customs which cannot easily be changed and that the people of this country must place themselves in an attitude of understanding and sympathy if they would do business with foreign countries.

Foreign Visitors

Among the foreign manufacturers present were: John R. Hyde, Robert Hyde & Son, Ltd., secretary of the Sheffield branch of the British Foundrymen's Association; W. H. I. Bailey, Robert Hyde & Son, Ltd., Sheffield; N. M. Brown and William Hudson, Lion Foundry Co., Ltd., Kirkintilloch, Scotland; H. Roe, the Adaptable Molding Machine Co., Birmingham; R. W. Williams, Sidney Williams & Co., Rochampton, Australia; James Teason, Ruston & Hobson, Lincoln; R. V. Patterson, Smith-Patterson Co., Ltd., Blaydon-on-Tyne; and James Potts, I. Taylor & Sons, Ltd., London.

The Exhibit Especially Notable

The exhibit of foundry equipment and machine tools, Sept. 29 to Oct. 3, was the largest held since such shows were inaugurated in 1906, excelling previous ones both in regard to the number of exhibits—206—and the amount of floor space occupied, exclusive of aisles—60,300 sq. ft. Nearly 200 motors were used to operate equipment. The Commercial Museum building in which the exhibit was housed proved to be admirably adapted to the purpose and comment was made that it was an exhibit without preferred space.

In THE IRON AGE of Sept. 25 was given a list of the exhibitors and brief mention of what each had on display. Limited space prevents a general elaboration of the exhibits, many of which were noteworthy as to size and novelty. In the edition of THE IRON AGE to which mention is made the names of two firms were unfortunately omitted from the summary of exhibits. They were E. C. Atkins & Co., Inc., Indianapolis, and the Julius King Optical Co., New York, both of which had exhibits which merited and received much attention.

The exhibit was not only well attended, but the statement was general that it exceeded in real value all previous shows in the direction of genuine interest on the part of persons it was desired to reach. An unprecedented volume of actual business was done during

the week, which in all respects was intensive. The show was open Tuesday night for employees of local plants and the evening proved a profitable one.

In the machine-tool section, an exhibit which attracted much attention was that of the English house of Alfred Herbert, Ltd., which has organized a New York branch for placing its tools on the American market. For American tool builders to exhibit abroad was commonplace before the war; an English house showing here is an innovation. The company showed a No. 9 Herbert combination turret lathe, a No. 4 Herbert hexagon turret lathe, with fittings, and a No. 1 Lumsden oscillating tool grinder, a machine evolved to eliminate tool forging. It was demonstrated grinding cutting tools from bar stock. The wheel oscillates by power controlled through a variable eccentric, it being possible to regulate the stroke without stopping the machine. It is asserted by the company that the machine will produce tools of 1 in. x 3/4 in. section at the rate of 20 per hr. While the Herbert exhibit was crowded most of the time, it is but fair to state that quite as much interest was shown in the exhibit of their American competitors, including the Warner & Swasey Co. and other American machine-tool makers and dealers.

The exhibits of dealers was noteworthy, especially those of the Vandyck-Churchill Co., the Swind Machinery Co. and the Monarch Machinery Co. being particularly comprehensive. A new tool shown by the Swind Machinery Co. was a new Bradford geared head lathe.

An exhibitor entitled to mention as a newcomer among those who have had their products at previous shows was the Chesapeake Iron Works, Baltimore, Md. In demonstrating the safety clutch of the 10-ton crane a young woman operator lowered a heavy weight until an egg, held in position by hand, was slightly cracked.

Shown for the first time by the Ajax Metal Co., was a 60-kw. 600-lb. Ajax-Wyatt electric furnace for melting yellow brass. It is an induction furnace, the operation of which was described in a paper read by G. H. Clamer, vice-president Ajax Metal Co., before the Boston meeting of the Institute of Metals.

Of interest in the booth of Rogers, Brown & Co., was a 12-cylinder Liberty motor, sections of which had been removed so that its operation might be better understood. The motor, after being exhibited in New York, will be permanently placed in the Smithsonian Institute.

These are but a few of many features of the show.

Ask Machine Tool Dealers for Rebate

TORONTO, Nov. 25.—Nearly every machine tool dealer is vitally interested in the move that is now being made by the United States Ordnance Department, in asking Canadian machine tool dealers for a rebate of two profits charged on duty on machines coming across the border for war work. When American contracts were first placed in Canada, the dealers did business direct with the firms holding these contracts. Shortly after that, word was sent out that the United States Government had taken over the shops, and business was to be done direct with their officers.

The point now in dispute can be stated best by a supposititious sale. A sale was made of a machine in United States costing \$1000, the duty on which at 35 per cent would bring the total price up to \$1350. On this price—\$1350—the Canadian dealer based his profit, realizing on an average 10 per cent, or \$350. The claim now is that the profit on this duty should be remitted to the United States Government on sale to plants that were handling their contracts. This would mean that the dealers would make on the sale \$100 instead of \$135.

The Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has presented two \$100 Liberty bonds to each of its 64 men who served with the American Expeditionary Forces and one \$100 bond to 39 who served in the United States. Of its 1400 employees, 265 were in service.

STEEL WAGES ARE HIGHEST

Pay to Workers Has Increased More Than in Any Industry

Wages in the steel industry have increased to a greater extent than in any other large industry of the country, according to comparative figures that have been compiled by the Bureau of Labor Statistics. These figures are of particular importance in connection with the steel strike.

The data covers a series of industries which show the relative earnings per hour since 1913.

A comparison is also made on the basis of the 1913 wages which are indexed at 100. On this showing, the wages in the iron and steel industry for 1919 was 221—the increase therefore was 121 per cent over the figures prevailing in 1913.

The following is a detailed table of the iron and steel industry:

Relative Earnings Per Hour in the Iron and Steel Industry, 1913 to 1919.

Year	Blast Furnaces	Bessemer Convert- ers	Open Hearth Furnaces	Puddling Mills	Blooming Mills
	(1913=100)				
1913	100	100	100	(a)	100
1914	101	90	100	(b) 100	102
1915	101	94	104	(b) 96	104
1916	(a)	(a)	(a)	(a)	(a)
1917	152	139	142	(a)	128
1918	(a)	(a)	(a)	(a)	(a)
1919	249	209	235	(b) 267	214
Year	Plate Mills	Standard Rail Mills	Bar Mills	Sheet Mills	Tin Plate Mills
1913	100	100	100	100	100
1914	101	99	96	101	102
1915	107	97	98	92	102
1916	(a)	(a)	(a)	(a)	(a)
1917	151	(a)	(a)	133	(a)
1918	(a)	(a)	(a)	(a)	(a)
1919	233	221	231	198	220
	All Departments				
1913	(c) 100				
1914	(c) 103				
1915	(c) 101				
1916	(a)				
1917	(d)				
1918	(a)				
1919	(c) 221				

(a) Not reported.

(b) Based on 1914; data for 1913 not being reported.

(c) Based on 9 departments in 1913, and 10 departments in other years.

(d) Not computed, as 4 departments were not reported.

The following table shows the percentage of increase in 1919, in each of the large industries covered. (Those marked "a" are 1918 percentages):

Iron and steel.....	221
Cotton goods.....	(a) 179
Hosiery and underwear.....	184
Silk goods.....	191
Woolens and worsted.....	163.976
Clothing (men's).....	171
Boots and shoes.....	(a) 147
Lumber mills (sawmills only).....	194
Millwork (sashes, doors, etc.).....	151
Furniture.....	154
Cigars.....	152

The census figures of 1914 show the following detail of wage earners in each of the industries covered:

Iron and steel.....	278,072
Cotton goods.....	393,404
Hosiery and underwear.....	150,520
Silk goods.....	108,170
Woolen and worsted.....	163,976
Clothing, men's.....	225,719
Boots and shoes.....	206,088
Lumber, millwork.....	618,163
Furniture.....	133,498
Cigars.....	178,872

*In all lumber manufacture.

†In all tobacco manufacture.

The same bureau has worked out a table showing changes in the cost of living in the United States for the same period. This reveals an increase of 77 per cent for June, 1919, over the average figures for 1913. This shows that the wages in the iron and steel industry increased far more rapidly than the reported cost of living.

The American Iron Products Co., Inc., 107 Liberty Street, New York, has rented a large iron and steel warehouse at Bush Terminal, Brooklyn, N. Y., from which it will make stock deliveries to steamers for export and also expects to enter the domestic field as an iron and steel jobber beginning January, 1920.

Machine Tool Builders Hold Fall Meeting

Hear Addresses on Present-Day Problems—Adopt
Resolution Opposing Metric System in America—
Discuss Publication of An Export Catalogue

THE National Machine Tool Builders' Association at its annual fall meeting at the Hotel Astor, New York, on Oct. 15 and 16, discussed the present trend of business conditions; listened to a number of excellent addresses; adopted a resolution opposing the adoption of the metric system in the United States, and spent considerable time in consideration of a plan to publish an export catalogue of machine tools for world-wide distribution. The latter proposition met with some opposition, and was finally placed in the hands of committees which will report at the next convention to be held at the Hotel Traymore, Atlantic City, N. J., in the spring.

World-wide Machine Tool Demand

President Albert E. Newton, in his opening address to the convention, said that he believed the world-wide demand for machine tools to-day to be as great, if not greater, than ever existed. "Probably all will agree," he said, "that increased production per capita is the essential factor that will enable the world to solve its present most critical difficulty. Surely, the greatest harm that could come to this world would be the stoppage of production. There is a decided shortage of skilled and unskilled labor in all industries, and there exists no immediate prospect of relief from this handicap."

"It follows, therefore, that the existing supply of workers must be enabled to produce more than ever before. This can only be accomplished, without added exertion on the part of the workers, by re-equipping our factories with modern labor-saving machinery, better tools and better fixtures."

"We know that if all machine shops could be re-equipped with new machines, such as we are able to build to-day, that the increased productive activity would be well worth while. In shops that concentrate their capacity on one or two articles and produce these in large quantities, machine-tool engineers can develop special machinery that will produce almost unbelievable quantities. There are thousands of factories equipped with hundreds of thousands of machines that are obsolete or practically so. The higher wages go and the shorter the supply of labor grows the more obsolete these machines become and the less we can afford to operate such equipment."

"It has already come to the point that, leaving aside all questions of higher labor cost, we cannot at this time afford to waste the time of a worker in operating an obsolete machine when he could be operating a new machine that would produce two to four times as much. The same is true where men are still doing by hand that which can be accomplished better and many times faster by machinery."

"If we could impress these facts upon the minds of even a small portion of machine-shop managers the demand for new machine tools would be so great that our shops would find themselves busier than they ever were before."

"Leaving aside the possibility of increased business for our industry, I believe it is our duty to do our utmost to devise ways and means to produce per capita in our own shop, in order to conserve labor and to seriously interest all other manufacturers in the same problem whether they require machine tools or not."

Plans for Selling Government Tools

Charles E. Hildreth, general manager of the association, who has for several months been serving the Government in outlining a plan for the disposal of surplus machine tools of the War Department, told the members of the association just what had been accomplished. He said that in his work he had gone on the principle that the Government would rather stimulate

the machine-tool industry and get more money for itself than to throw millions of dollars' worth of machinery on the market at greatly sacrificed prices. The first plan of the Government was to sell the tools by means of sealed proposals, but Mr. Hildreth succeeded in getting this plan shelved in favor of the now adopted plan by which every machine tool has been inventoried and a valuation, scientifically worked out, placed upon it. Under this plan even the man who wants to buy only one machine will be able to place his order for a Government tool if he wishes to do so. Mr. Hildreth said that one thing he had accomplished was preventing the sale of \$940,000 worth of tools from the plant of the Union Switch & Signal Co., Swissdale, Pa., for \$275,000. The Bureau of Aircraft Production had practically completed the sale. Since the machines have been inventoried and their value estimated, sales of about one-third of them have brought a total of \$278,000. Mr. Hildreth said the auction method of disposing of tools would be resorted to in some instances, but only where the tools are in very poor condition. On Aug. 1, when Mr. Hildreth completed his work, the Government tools inventoried about \$65,000,000 to \$70,000,000, of which about one-third was special machinery. Much, if not all, of this special machinery will probably be shipped abroad. There is now practically no new machinery for sale by the Government, but a considerable part of the used equipment is in good condition. Most of the new machinery has been placed in Government arsenals. Mr. Hildreth stated that his estimate of the value of the machine tools to be sold by the Government was not inclusive of the machine tools in France.

O. H. Broxterman, chairman of a committee to obtain machine tools for the Lord Roberts' Memorial and for schools in China, reported that the committee had been only partially successful. R. W. Ellingham presented a report dealing with the work of the committee on research and standards and C. L. Taylor spoke for the committee which has investigated the possibilities of combination for export trade under the Webb law. Mr. Taylor said it was the judgment of the committee that the formation of a new export combination of machine tool manufacturers would be a stupendous undertaking and the committee advised manufacturers to make connections with export organizations which are now formed and having working organizations.

The convention held an executive session to hear a report by S. H. Bullard, chairman of a committee appointed at the last convention to investigate the advisability of publishing an association catalogue of machine tools for export trade development. The committee's report was favorable to the project, but several objections to the program were raised by members. A further discussion of the subject was held in executive session the following day, and the final decision was to leave it to the committee for an additional report at the next meeting.

Address on Cost Accounting

An instructive address on cost accounting for machine tool manufacturers was delivered by William R. Basset of the Miller, Franklin, Basset Co., New York. He laid stress on the importance of getting into the cost sheet every item of expense that a company incurs. He recited a number of illustrations of associations and individual companies that thought they had good cost systems, but whose cost systems were not inclusive. In this connection he pointed to some of the items of expense that he had found the average manufacturer almost inevitably leaves out of the reckoning when figuring costs. He said:

"In machine tool building, as an instance, there is the matter of spoilage. You will start, we will say,

100 pieces into the works which, upon completion, will be assembled into a machine tool. The hundred seldom emerge at the other end, complete and ready for assembly. Four or five will be spoiled at the third, fourth or fifth operation, or before they reach the assembly floor.

"In a great majority of instances I have found that the manufacturer will gather the costs of the parts that go through by getting a proper operation cost for his labor and overhead, but neglect the fact that the cost of those parts that are spoiled must be added to the salable parts. On each spoiled part you must compile the cost of the materials, labor and overhead expense of the operations through which the part traveled before it met with disaster and spread that expense over the parts that successfully made the trip. Therefore, if 95 parts go through, the cost of the 95 is the multiplication of the cost of 100 divided by 95.

"I mention the element of spoilage as one of possibly several hundred items in which I know the average machine tool builder may err when devising a cost system. If two manufacturers decide the same point differently, their costs cease to be uniform, and when all of the points of difference are considered one can hardly wonder that so few of your cost systems give you uniform costs.

"There is the question of bonuses on labor. We are all tending towards bonuses to propitiate labor. You cannot open a newspaper without reading of a newly declared strike.

"To avoid these strikes many of us are taking steps to give greater rewards to the workmen. We do not want to increase the hourly rate if we can avoid it, because that does not increase production. We endeavor, wherever possible, to give some form of incentive.

"There has been in the last few years considerable discussion about profit-sharing. In the considerably over 1000 factories in which my organization has served we have come in contact with a great many profit-sharing schemes.

"We recently sent a representative to Europe to study a number of plans in operation in Germany, Holland and England. We have yet to find a profit-sharing plan through which the workmen share in the profits of the company as a whole that is worthy of consideration and that you can install in your plant with the justified expectation of profiting thereby.

"Capital takes a risk that labor does not take. If we could devise some fashion in which labor could be made to take a share of the losses as well as the profits, a proper profit-sharing scheme might be devised; but even when profits are more or less continuous, and it is possible to dip our hands into the money bags and pass out a few coins in the way of profit-sharing to the workmen, the desired results are not secured, because the reward is too remote from the workman's effort."

Bainbridge Colby of New York, formerly of the United States Shipping Board, discussing the subject, "World Relations and Markets," dwelt upon the situation in the coal trade in England as relevant to the industrial problems which America also faces.

"We are ready in the United States," Mr. Colby said, "to pick up the abandoned markets of our European competitors, but we do not know how to begin. We see the advantages of foreign trade; we see the advantages of locating the world's financial control in our own country; but we do not see the processes and the methods by which this happy consummation is to be reached. We have got to be a more thorough, a more patient, a more studious, a more docile, a more open-minded and a less sufficient and self-satisfied people."

Touching upon the industrial problem, Mr. Colby said:

"The I. W. W. is to-day gnawing and eating into the vitals of the American Federation of Labor in pursuance of an openly avowed program to unseat the rational and responsible control of this federation and to substitute for it the violent capture of Government and capitalistic overthrow, which is the central feature of the I. W. W. program.

"Labor to-day under the tutoring of the I. W. W. admits that it is receiving better pay than ever before,

admits that its pay is entirely adequate to its immediate wants; but the thought that labor has accepted, that has been dinned into its mind, is that the man who is getting six or eight dollars a day is producing eighty or one hundred dollars a week by his labor, and that the six or eight dollars he is receiving is not a fair division of the results of his toil. You all know, we all know, that this is utterly fallacious. We encountered the same argument in some of our Shipping Board collisions with labor, and the only way we could cope with it was to have our shipyards exhibit their balance sheets with the aid of blackboards and simple and lucid illustrations."

The morning of Oct. 16 was entirely taken up with committee meetings. At the afternoon session an address on "International Finance" was made by George B. Mallon of the Bankers Trust Co., New York, who said in part:

"If labor was shamelessly exploited by some capitalists 20 years ago, we may assert with equal justice that some reckless labor leaders are now trying to shamelessly exploit capital. There never was a more vicious doctrine preached than that the interests of labor and capital are, in theory and practice, antagonistic. Frequently in practice this is true, but never in sound economic theory. The real interests of labor and capital are fundamentally mutual—as mutual as should be the interests of husband and wife. They must of necessity work together to produce the real wealth of the world—not money—but the necessities of life and its luxuries, which are constantly raising the standard of living for all of us.

"Our present labor unrest is largely the result of the upheaval by war of the eternal question of the relationships between labor and capital, and we must hope that both labor and capital will approach this problem with fairness and an honest desire to settle it justly. There has never been a time when more men were thinking seriously and honestly about these vital social problems; and there probably never has been a time when more men with slates and pencils, or on soap boxes, were wasting time on fantastic schemes to reconstruct the world over night. Under the urge of war our form of Government made, of necessity probably—a long step toward State Socialism. Have the results up to date justified us in going further?"

Alexander Luchars, publisher of *Machinery*, who has recently completed a trip to Europe as special trade commissioner for the Department of Commerce, described his impressions of conditions in the more important European countries as they affect the machine-tool industry. Mr. Luchars went over much the same ground that he has covered in his official reports. These reports have been issued for publication by the Department of Commerce. The one on England appeared in *THE IRON AGE* of Aug. 28, page 573.

The convention adjourned after re-electing the same officers who served during the last year and selecting the Hotel Traymore, Atlantic City, N. J., as the place for the spring meeting.

Sustained Fabricated Steel Business

The records of the Bridge Builders and Structural Society, as collected by George E. Gifford, 50 Church Street, New York, its secretary, show that in October 77½ per cent of the capacity of the bridge and structural shops of the country was put under contract. This compares with 78½ per cent for both September and August. October business was thus about 139,500 tons, with September and August amounting to 141,300 tons. The 880,000 tons of business taken in the ten months of this year compare with 910,000 tons for the first ten months of 1913, all intervening years being better ones in respect to the volume of business. One difference is that business dwindled down in 1913 as the year wore on while the reverse has been true this year. The total volume for the first quarter of 1913 was 327,000 tons, against 75,500 tons for the corresponding quarter of this year. In the second quarter business was 267,000 and 249,000 tons for 1913 and 1919, respectively, and the third quarter business, 245,000 and 416,000 tons for 1913 and 1919, respectively.

Machine Tool Conditions In Europe

Trade Commissioner Luchars Reports on France, Italy, Switzerland and Holland as Result of Trip in Behalf of United States Department of Commerce

WASHINGTON, Oct. 31.—The Bureau of Foreign and Domestic Commerce of the Department of Commerce has issued a bulletin covering the report on machine tool conditions in France, Italy, Switzerland and Holland, written by Alexanders Luchars, publisher of *Machinery*, New York, who went abroad as trade commissioner for the department. The report, which was dated Paris, Sept. 8, is in part as follows:

FRANCE

PARIS, Sept. 8.—When the contract was signed last week by the American Liquidation Commission to sell \$400,000,000 to the French Government, about three-quarters of the war material in France belonging to the United States Government, a big transaction was completed. The material sold, which cost about \$1,300,000,000, included, besides enormous quantities of machinery, supplies and material, all the machine tools which had been sent to France by the War Department.

As is usually the case, there is a wide difference in the estimates of the value and amount of the machine tools, among dealers and others interested, varying from 400,000,000 to 100,000,000 francs.* The latter sum I believe to be near the actual value.

Some of these tools are now being sold by the French Government to manufacturers in the devastated areas, and some used elsewhere. So far these sales have not materially affected the sales of American tools here, these being in good demand, and many dealers say their volume of sales for 1919 exceeds that of the corresponding period of 1918. It is not thought that many of the machine tools involved in this purchase will come on the market, as the best will probably be retained for adjustments in government plants.

French Machine Tool Manufacturers

The enormous expansion in the use of machine tools during the war has caused a surprisingly small increase in the number of French machine tool builders. Two or three of the older firms for some years have been using modern methods and these have enlarged their plants and improved their equipment. Others appear to have learned nothing since 1914. The following is a list of these of interest to our manufacturers.

H. Ernault, 46 rue Ledru-Rollin, Ivry, Paris, built new factory just before beginning of war; makes lathes (single pulley drive) and double spindle horizontal boring machines. Far behind in deliveries. Design of lathes is criticized by some machine tool experts, but workmanship is excellent.

Cazenueve, La Plaine St. Denis (Seine); small factory. Makes lathes and small tool grinders, for which there was a large sale during the war.

S. O. M. U. A. (Société d'Outillage Mécanique et d'Usinage d'Artillerie). Capital 32,000,000 francs; 19 Avenue de la Gare, St. Ouen; formerly Société Française des Machines Outils, then bought by Bouhey, now owned by Schneider, make lathes, planers, milling machines, slotting machines, and heavy machines, such as horizontal boring machines, etc. Have a good demand for their product and are now sold out many months ahead. The product of this company compares favorably with the best, American tool users say.

P. Hure, warehouses, 218 rue Lafayette, Paris; works at Pantin (Seine) makes milling machines. Bought by users owing to scarcity of American machines. Has not made much progress during war.

Bariquand et Marre, 127 rue Oberkampf, Paris, make milling machines and operation lathes. Not of much importance as competitors of American machines. Very old firm. Also make hair-clippers, micrometers, Vernier calipers, screws, taps, dies, gauges and special drilling machines.

Rouchand & Lamassiaude, Limoges; vertical milling machine similar to Becker No. 2-A. Very well built, and price about one-third lower than Becker's agents' price for 2-A. Now building No. 4 vertical, copied largely from Cincinnati design. During war also built shell lathes and shell centering machines. Product before the war, machinery for porcelain industry. Guillet Fils, Auxerre, makers of wood-working machines, have built a large number of lathes for shell work. They will continue building wood-working machinery, which is in active demand, but will also build a vertical boring mill.

Leflaive & Cie., St. Etienne, are building some large machines—boring mills, lathes and planers.

*The French franc, now selling at about 11 American cents, is normally worth about 19 cents.

Guillemin, Sergot & Pegard, Albert (Somme) and at Perigeux (Dordogne), engine lathes and shapers.
Jost & Cie., 103-105 Rue Villiers, Paris, drill presses.
Cuttat & Cie., 53 Rue Servan, Paris, screw machines.
Société des Usines Curial, 31 Rue Curial, Paris, have begun to manufacture small tools and expect to develop a large business, having ample financial backing; have engaged an American works manager, formerly superintendent of the small tool department of the Pratt & Whitney Co. One of the largest French steel works is reported to plan to go into small tool manufacture on a large scale having also endeavored to obtain a works manager with experience in the United States.

Machine Tool Dealers

There have been few changes among dealers since I was here during the war. With the exception of the Associated British Machine Tool Makers, Ltd., there are no important additions to the number of French machine tool dealers since 1914. Nearly all have made money during the past five years; but some have pushed ahead of their confrères, improved their selling methods, expanded their lines and strengthened their organizations; others appear to be where they were in 1914. Most say that business is good, especially in the northern and northeastern parts of France; but even in those sections which suffered most from the German invasion some French manufacturers are buying German tools, rather than American, on account of the difference in price. The exchange rate with France, as with the other Allies, is very favorable to the Germans in selling, 45 francs equalling 100 marks. With the Swiss franc there is even more difference, 100 Swiss francs being worth 141 French francs. The purchases referred to are, however, confined to heavy machines, so far as I could learn. The large number of American tools used in France during the war, most of which were creditable examples of American products, have been a great help in educating French manufacturers still further in the use of tools of the best quality.

Wages

The prices established for labor during the war have not receded and are not likely to.

	Per Hour	
	1914	1919
Lathe Hands	Frs. 0.95 to 1.25	Frs. 3.75
Assemblers	0.95 to 1.90	3.80
Toolsmiths	1.25 to 1.90	4.00 to 5.00
Helpers	0.80 to 1.05	2.00
Moulders	.....	3.00

These are about the prevailing wages in and around Paris, and in other manufacturing centers where labor is in good demand. Less is paid in small centers, where living is cheaper.

Automobile Manufacture

The principal demand for machine tools comes from automobile manufacturers, who are busily preparing for 1920. The duty of 70 per cent on American cars will almost close this market to them, especially as the Italian product is admitted at 15 per cent. All the high priced French automobiles include special features that appeal to the French buyers, and which in the American product are sacrificed for increased output. The French are really makers—not manufacturers. There is, of course, no market for automobiles here as exists in America, but some makers are trying for the low-priced field. One well-known manufacturer, formerly in the gear business, who is credited with having made a fortune in munitions, has changed over his plant to produce a low-priced car in quantities. He originally planned to produce one hundred cars a day, to sell at 8,000 francs. He has reached an output of 12 cars a day, and hopes to increase to 25, but is selling them at 10,000 francs. Some of the most important manufacturers of automobiles are: Renault, Billancourt (Seine), who were employing about 27,000 hands when armistice was signed; Panhard & Levassor, 17 Avenue d'Ivry, Paris; Delaunay-Belleville, St. Denis, (Seine); Saurer,

motor trucks, Puteaux (Seine); Unic, Puteaux (Seine); De Dion Bouton, Puteaux (Seine); Lorraine-Dietrich, Argenteuil (Seine et Oise); Clement-Bayard, Levallois-Perret (Seine); Hispano-Suiza, Bois Colombes (Seine); the latter were rather small before the war, but made such a good name for themselves with their aviation engine that they will doubtless become more important now; Peugeot, Levallois-Perret (Seine); Brasier, Ivry-Port (Seine); Hotchkiss, St. Denis (Seine); Andre Citroen, 31 Quai de Grenelle, Paris; Berliet, 239 Avenue Berthelot, Lyon; Rochet Schneider, Chemin Feuillat, Lyon; Zenith, Chemin Feuillat, Lyon; Cottin & Desgouttes, Place du Bachut, Lyon-Monplaisir; and La Buire, Place de la Buire, Lyon.

As the Future Now Looks

From an agricultural, textile and luxury-producing country, France doubtless will be pushed into the manufacture of metal articles by her acquisition of iron ore fields; but this development will be gradual, for it takes time to change habits, ideas and industries of a people. The Germans say that their toy industry represents the growth of more than a hundred years and cannot be taken from them by the British with an experience of less than five. It is probable that after the present demand for machine tools in France is satisfied, there will follow a quiet period, which in turn will be followed by a gradual and healthy increase in demand, as the manufacture of metal articles develops.

ITALY

The industrial outlook in Italy is uncertain. In the best hotels food is scarce—a sure indication, even to the hurrying traveler, that the needs of the working people are urgent. The lack of coal and other natural resources is a heavy handicap to any nation that seeks to thrive from manufacturing, although in Italy this lack is partly made up by the development of water power, the sources of which abound in Northern Italy. The Italians fully appreciate the gravity of this situation and are making strenuous efforts to utilize their water power wherever practicable. Near Bellagio, in the Como district, where coal is selling at \$70 a ton, five thousand men have been working for months developing a hydraulic plant to generate about 4,000 horsepower for the railways.

Divided Opinions About the Future

The agents of American machine tool manufacturers are not of one mind as to the future for our tools in Italy, but are looking forward hopefully, now that the import restrictions have been removed. On certain lines of tools, especially heavy machines and the cheaper grades of machine tools, there is great fear of German competition, and we shall have difficulty in approaching their prices unless German manufacturers are further handicapped by labor and material costs. On heavy presses and forging machines, large radials and milling machines, planers and special tools for metal products, we shall be unable to compete with German prices on machines delivered in Italy. And the cheaper grades of standard machine tools, of which there are so many German makers, will appeal to many Italian manufacturers who are not educated to paying the difference between the best American tools and German products at 25 per cent to 33 per cent less. While a market will continue to exist in Italy for the best-known American tools, the exchange situation there, as elsewhere in Europe, is a heavy tax on our sales. The demand for high-priced, labor-saving tools will come from such concerns as Ansaldo and Fiat, but it is much to be feared that the small manufacturers will be content with the cheaper and inferior tools. Ansaldo* continues their pre-war policy of general expansion, having no less than twenty-seven different establishments and six associated concerns, employing 50,000 workers, men and women. The Fiat Works† made a considerable number

of machine tools for their own use during the war and will continue to make lathes for the market.

Italian Machine Tool Makers

According to Ing. Michele Ferrero, president of the Association of Machine Tool and Small Tool Importers and Merchants, during the war there were in Italy about a dozen factories producing machine tools exclusively, employing a total of 1,500 workers, varying in size from 500 to 50 employees. There were also about 30 factories, producing machine tools as a side line. Of these 42 factories only three or four of the smallest specialized on a single type of machine, the others building varied lines in the old-fashioned way. Now there are about a dozen employing some two thousand workers who are producing (some very good) lathes, shapers, small milling machines, drilling machines and a variety of special tools for metal sundries. The value of machine tools produced before the war was about thirty million lire‡ annually (at present prices), which rose during the war to ninety millions and is now, it is estimated, less than ten millions. Although there are a few Italian machine tool makers who produce machines of excellent quality, it does not appear from this showing, and from the conditions in other machine tool producing countries, that Italy will soon become an important factor in the production of machine tools.

Italian industrial conditions are subject to so many influences that it is difficult to forecast their future. Many factories that have been producing munitions and other war material have not yet returned to their pre-war product. A large part of the equipment in these factories consists of American machine tools, and many of these are coming on the market as the change-over to another product is being made.

SWITZERLAND

Before the war there were only two machine tool building concerns of any importance in Switzerland—Wunderli at Uster. During the war a number of machine builders produced radials, boring mills, tool grinders, screw machines, small plain milling machines, small lathes and other light tools. Oerlikon, which is the oldest machine tool concern in Switzerland, with a reputation for good work, builds engine lathes, horizontal and vertical milling machines, No. 3 horizontal boring machines (floor and table types), radial drills, and have under construction a No. 2 milling machine, a type popular in both Switzerland and France; also a high speed lathe, geared-head with hardened and ground gears made by Maag of Zurich, and said to be quite a departure in that line. Oerlikon has also placed on the market a bevel gear planer, the general operating principle of which is similar to the Gleason "forming" type. The action of the planing tools is controlled by templates of the proper curvature, and there are two tool slides, each carrying a tool for planing both sides of a tooth simultaneously. The machine operates automatically after the gear blank has been placed in position. The drive is either from a single pulley or motor, and the speeds are regulated by a geared speed box of the quick change type. These machines are regularly manufactured in two sizes for cutting gears having maximum modules of 12 (2.117 diametral pitch) and 15 (1.694 diametral pitch), respectively. Three larger sizes have also been designed, the largest of which will cut gears having a maximum module of 35 (.725 diametral pitch). Fritz Wunderli produces small universal grinders, two sizes, wet tool grinders, and surface grinders somewhat resembling Brown & Sharpe No. 2, which compare favorably with American machines. The Wunderli factory is small, but run on efficient American lines and has a reputation for good workmanship. During the war Wunderli built many small plain milling machines for England. Besides these firms there are a number of smaller makers: Kellenberger & Co., St. Gall, who build lathes and a tool grinder similar to the Greenfield; Schaufelberger & Co., Zurich, a radial drilling machine

*Societa Anonima Italiana Gio Ansaldo & Co., Headquarters, Genoa.

†Fabbrica Italiana Automobili Torino, Headquarters, Turin.

‡A lira is now worth between 8½ and 9 American cents. Normal value, 19.3 cents.

with single pulley drive, lathes, milling machines, turret lathes and horizontal boring mills; G. Betz, Sons & Co., Bale, shapers; H. & J. Graa, LeLocle, precision lathes; Widmer & Huber, Lucerne, universal milling machines; Buhlmann & Simonet, Soleure, precision lathes; Fabrique de Machines Essaimé, Tavannes, presses, lathes, shapers, drilling machines, screw machines and gages; Max Thum, Geneva, small grinders; O. Seeberger & Co., Brougg, a line of planers; Henri Levy Rorschach, universal milling machines of the column-and-knee type; Benninger, Uzwil, lathes of geared head and cone-pulley types; Sarbach, Geneva, cylindrical grinders and surface grinders of the vertical-spindle type; Joseph Peterman, Moutier, automatic screw machines; Schroter & Jenny, Schaffhausen, make a gear hobber, Pfauter type, but following the Eberhardt design; also a line of engine and turret lathes. Several Swiss, German and Scandinavian concerns have started making lathe chucks.

Price Comparisons

The Swiss machine tool market is small; but for American tools of high reputation there will continue to be a demand, because Swiss mechanics appreciate tools of quality. The Swiss franc, as stated elsewhere, is worth more than the French franc, so that German tools sell for correspondingly less, and buyers institute comparisons between the American and German prices that are sometimes difficult to meet. On large tools this difference is striking; one such case concerns a 24-in. Gisholt turret lathe costing approximately 25,000 (Swiss) francs at New York, transportation 5,000 francs; total 30,000 francs in Switzerland against 13,000 francs for a German Meinemann machine closely resembling the Gisholt. It is evident that only the high reputation and sterling qualities of American machines will enable foreign dealers to sell them in the face of such price competition.

HOLLAND

Holland was an agricultural and a trading, rather than a manufacturing country when I was last there; and since then the increase in manufacturing is distinctly noticeable. Holland presents every appearance of prosperity. The cities are crowded with well-fed, contented-looking people; the towns are well kept and the fields full of fat cattle; but the world-wide causes for discontent exist here as elsewhere. Food is plentiful and looks high to the Dutch compared with pre-war prices; but only a few items are higher than in the United States. There are few automobiles or motor trucks; fat Dutch horses pull the wagons through the streets.

War Conditions and After

When the blockade became effective, Dutch manufacturers and dealers were entirely cut off from American supplies. Only lately (July) have orders been coming through. One large shipbuilding company then began receiving deliveries on a steel order placed in 1916. Shipbuilding, which is one of the most important Dutch industries, was almost suspended for lack of material. German material manufacturers refused to sell the Dutch unless the latter executed an agreement that the ships built therewith should not be used by any of the Entente Allies for a period of five years; and similar restrictions were insisted on by British material manufacturers against the Central powers. It was a case of "the devil and the deep sea," England taking care of the latter rôle.

A good many Dutch machine tool dealers, being unable to get American tools turned to German makers, not only to keep their business going, but because—especially during the last six months of the war—German tools were offered at bargain prices; consequently the Dutch market is glutted with them. It is estimated that these stocks can be worked off by 1920-21, if shipbuilding and the other industries requiring them continue to be prosperous.

The German tools I saw in Holland, built during the last months of the war and since, were mostly of inferior quality and finish to those now produced by the best German makers; and if those in the warehouses

are no better there will be great difficulty in disposing of them even at bargain prices. They do not compare at all with the best American tools. Swiss tools cost about the same as American in Holland.

Germans Going Strong After Dutch Market

There does not appear to be any friendly feeling—in fact there is much hostility, among the commercial classes toward the Germans; but they will certainly buy German goods, including machine tools, if the quality and price offer a strong enough inducement. The Germans are determined to do business with the Dutch. German commercial travelers swarm over Holland and up-to-date German catalogs and price lists—evidently prepared and printed since the armistice, have been sent out broadcast. Many of these have been produced almost regardless of cost, creating an impression of productive ability in striking contrast with the actual conditions to be found in Germany.

German Bargain Prices

The Germans exercise great ingenuity in converting war material into articles for peaceful uses and at prices which look very attractive to buyers. One German manufacturer of structural and bridge material, cranes, etc., is offering such material at about one-half what it can be produced for in England or Holland, as they say their government has already paid them a large proportion of the contract price. One lot of material needed by a shipbuilding company was offered for 1,250 marks, which the head of the concern, who is an Englishman, said would cost about £60 in England. On another lot of tools for the same concern, used on ship construction, such as punches, presses, etc., the British price was £900, the German, £600. For this class of American products, in Holland and elsewhere in Europe, there is a very limited market on account of the heavy freight charges. Neither the German nor the Scandinavian product that I saw equals the best American machine tools in design and workmanship, and there will be a market for our tools in spite of the present glut of German machines. How we shall stand up against the better quality of German tools that are now being turned out by the best makers is another question.

Pollak Company Acquires Rolling Mills

The Pollak Steel Co. has closed negotiations with the Intestate Iron & Steel Co., Chicago, whereby the Pollak company has acquired the Interstate rolling mill property at Marion, Ohio. The sale comprises contracts, land, buildings and machinery, and also raw and finished materials and supplies located at Marion. By this move the Pollak company, which has plants in Cincinnati and South Chicago and has been known for years as a manufacturer of railroad car axles, locomotive forgings and heavy forgings for marine and machine builders, enters under active operation the field of manufacture of shapes, angles and bars, as well as concrete reinforcing bars for the building trade, agricultural implement manufacturers and the tractor and automobile trades.

Some time ago, a mention was made in these columns of the plans of this company to build a plant for bars and structural steel and also of the extensions made to the South Chicago plant, now completed, for manufacturing drop forgings for the automobile, tractor and agricultural implement trade. Additions have also been made to the Cincinnati plant for the manufacture of automobile parts.

The Interstate company made the sale in accordance with its plans of carrying out a policy of concentration in the Chicago district, where it has new construction under way.

The Pollak company is now credited with the capacity of both rolled and forged products of approximately 300,000 tons a year. It is a closed corporation owned by the Pollak family with E. Pollak, M. E. Pollak, and J. A. Pollak, located at Cincinnati, and B. E. Pollak, located in the New York offices in the Equitable Building. The general sales offices are also in the New York office, with D. E. Sawyer, general manager of sales, in charge.

German Steel Trade More Hopeful

Workers Make Better Output—Coal and Ore Shortage Cut Down Production—Scarcity of Railroad Steel and Equipment—Prices Rising

(Special Correspondence)

BERLIN, Oct. 28.—No marked changes in the iron trade have been reported since my last review, but the tendency among producers appears to be to take a somewhat more hopeful view of the outlook. Thus at the annual meeting of the Hasper Co. several days ago Director Kloeckner, who is generally recognized as one of the most authoritative spokesmen for the Rhenish-Westphalian district, said that the output of the workmen had considerably improved of late, that the piece-work system of payment had been more and more reintroduced, and this had tended to faster, steadier work. Several other company directors have expressed themselves similarly. It was also said at annual meetings that the companies are well supplied with orders; and good foreign orders have been variously reported.

The price advances mentioned in my last report were finally sanctioned by the government; but it refused to allow the additional 50 marks originally asked for by the works. The price question, however, is generally regarded as only temporarily settled, particularly in view of the fact that coal producers are already trying to obtain a further advance for November. It is granted it is certain that the iron and steel interests will make every effort to get higher prices on their products beginning with November.

Owing to the advances referred to manufacturers of the more finished products have been marking up prices to correspond. This applies to wire, rivets and screws, locks and hardware generally, and to piping. In the Siegerland region ore sales for November have been opened at unchanged prices, but in the adjacent region around Wetzlar brown iron ore has been raised.

Prices Will Remain High

So far as prices in the world's markets are concerned, it is assumed among German producers that these will remain high for a long time to come. It is mentioned, however, that competition between the different producing countries for the world's trade has really not yet begun; but the tendency is already noted here among the producers of several countries to prepare the way for re-establishing the international agreements that existed before the war.

As foreshadowed, September showed a reduction in the make of pig iron. The total was 531,167 tons, comparing with 569,375 tons in August. The figures would have been considerably less favorable but for the fact that the Silesian district registered a gain of about 25 per cent. The output of crude steel was 737,516 tons, as against 739,387 tons for August. Here again the Silesian district is responsible for the better showing, there having been a gain there of 62 per cent in production. This good showing is due to the fact that there had been big strikes in Silesia in August. The Silesian district, however, is just now especially hard hit by the resumption of the blockade in the Baltic Sea, which makes it impossible to bring in Swedish ores. This affects the Rhenish-Westphalian furnaces also, but to a less extent, as they lie nearer the German mines and are also able to obtain certain quantities of ores from Lorraine.

German Exchange of Coal for French Ore

The loss of mining lands in French Lorraine and elsewhere in France will prove a heavy blow to some of the big German companies. Thus Phoenix and the Gutehoffnungs-Huetten lose each about 9380 acres, Deutsch-Luxemburg 4050, "Deutscher Kaiser" 2054, Krupp 1436, Rheinische Stahlwerke 1266 and others smaller areas. Among the Saar companies the Stumm concern is the biggest loser, with 6338 acres. It is assumed that these properties will be confiscated and be a total loss to their owners. According to figures printed

here the war leaves France in a commanding position in the iron ore markets of Europe. Its ore reserves are estimated at 10,827,000,000 tons, comparing with 1,300,000,000 for England, 1,227,000,000 for Germany and 1,158,000,000 for Sweden. On the part of the German iron men it is hoped that a trade exchange can be arranged with the French ore producers later, the Germans giving Westphalia coal or coke for Lorraine ores. Such an arrangement, in fact, is already in operation on a limited scale.

France Buying in Germany

In a still more important direction German iron and steel interests are expecting to profit from trade with France. It is noted that the French have begun to place orders for machinery of various kinds here, in preference to sending such orders to America and England. This is due to the depreciation of the French franc, which makes it very disadvantageous to buy in Anglo-Saxon countries. On the other hand, the far greater depreciation of German currency enables the French to obtain machinery here at relatively low cost. The first orders for machinery were only recently placed in Germany, but it is expected that further large orders will be coming in later.

Director Kloeckner, in the address already quoted, said that the market situation was quite obscure. There was, he said, a very keen demand for coal and for all forms of iron and steel. Ore prices were tending upward as the German mark depreciated, and this was forcing up the price of pig also. This latter tendency was also promoted by the rapid rise of scrap iron, which has taken place since the war organization controlling such material was dissolved and prices left to themselves. The behavior of the old material market since all restrictions were removed shows, says Kloeckner, "that the present market position is not yet such as to warrant the system of unrestricted sales desired by many. I approve, therefore, the efforts of the government to keep prices low. In spite of its precautions, however, the government will have to consider further advances because the upward tendency in the world's markets shows as yet no signs of having reached a standstill. It appears to me necessary that the government liberate the export business from all restrictions."

He further argued that if the export trade were set free of restrictions there would be a relaxation of home buying for the reason that "a large part of our home demand is really concealed inquiry for export. A considerable part of the steel ordered for home account already goes across the Rhine for export." He also recommended the early development of the Steel Works Association so as to include all the works in Germany.

The condition of the market for scrap is variously commented upon in market reports, from which it appears that heavy speculation in such material has been in progress ever since the restrictive measures were withdrawn. Prices have been carried to such a high level that conditions are now regarded as unnatural. The best grades now range between 550 and 600 marks, as compared with 425 to 450 marks around the middle of September.

Railroad Facilities Much Impaired

The iron trade is still being injuriously affected by the failure of transportation facilities. In the Rhenish-Westphalian district the railroad authorities are now able to place at the disposal of the coal producers only about half as many cars as they call for. At all company meetings held recently there were loud complaints over the obstruction of business through the car and locomotive shortage. Not a few works are running

considerably below their capacity because of the impossibility of obtaining coal or coke, ores or iron and steel material. There is also a scarcity of steel rails. In the Saxon assembly it was said last week that there could be no building or repairing of railroads and street railroads for two or three years because of the impossibility of getting rails.

There is still considerable talk about good foreign demand for steel products of various kinds. In the Silesian district some 30,000,000 marks' worth of foreign orders were taken in one week about the middle of the month. These came chiefly through Holland, but it is believed they are for French or English account.

The Bismarck-Huette in the Silesian district has declared a dividend of 5 per cent, which compares with 30 per cent last year. The net earnings were only 1,163,000 marks, as against 7,472,000 marks last year. The Geisweider Eisenwerke, the most important concern in the Siegerland district, pays 10 per cent on its common stock, against 28 per cent last year.

The Krupp company is gradually changing to peace products, a process which is reported as causing no slight difficulties, as the establishment was the greatest producer of artillery, munitions and other military supplies during the war. The company has recently disposed of its Munich branch, which was established there

only about three or four years ago, and which has not proved a success. The great Essen concern is casting about for other branches of production to take the place of war products. Quite recently it has annexed a concern in Baden that manufactures agricultural machinery, in which Swiss capital is interested.

French Acquiring German Steel Plants

The process of selling out the German iron companies of Lorraine, Luxemburg and German territory west of the Rhine continues. Thyssen has sold his steel works at Hagendingen to a French group for 150,000,000 francs. The Rombacher Huette works has also just been acquired by several French companies for 110,000,000 marks. The same price was paid for the works of the Lothringer Huette and Bergwerkverein, exclusive of its ore interests in Lorraine and the Briey district. A French group has taken an option on the French properties of the Gelsenkirchen company for 100,000,000 marks, while a Luxemburg and Belgian group are acquiring the ore mines and steel works in Luxemburg and in German territory west of the Rhine (the old Rothe Erde and Eschweiler concerns) for a sum amounting to about 125,000,000 francs. The two groups propose an amalgamation then into one great company. The options lapse at the middle of November.

BELGIUM RECOVERING

Machinery Taken by Germans Restored to Owners—Labor Conditions Improve

WASHINGTON, Nov. 25.—Out of 9797 pieces of machinery taken from Belgium during the German occupation, 5069 have been recovered, according to a special report on the industrial situation in Belgium, made by Trade Commissioner Herrings at Brussels. The iron and steel industries, however, have been much hampered by the necessity for importing all of the ore and much of the fuel which it needs. Transportation facilities for heavy products are also not up to the pre-war standard.

The great scarcity of coke continues to react unfavorably upon such of the steel plants as have resumed operations; only 643 ovens are now in full operation out of the 2554 which were producing in 1914. The important zinc and lead industry is slowly reviving, but it is confronted by great difficulties on account of the scarcity of ore, high cost of labor and present inflated ocean and continental freight rates. Of the 18 Portland cement factories, seven have resumed production.

Belgium is slowly recovering also from the enforced idleness of a large percentage of its people during the war. At the time of the armistice, a year ago, 800,000 persons were drawing a non-employment allowance from the Government. In February the number was still 720,000, while in September, 1919, the number had been reduced to 200,000. These allowances cost the Government of Belgium 57,000,000 francs in December, 1918, as compared to about 15,00,000 francs per month at present.

"The Belgian Government," says the report, "has actively intervened to settle labor disputes with very gratifying results. Chiefly as a result of the chômage system, it has been able to force arbitration in nearly all cases, and it has a large staff of labor inspectors who are empowered to adjudicate disputes before a crisis is reached. While wages have increased in most industries at least 100 per cent, and in some cases considerably more, they have not risen to the extent that the cost of living has advanced. The labor-union movement is well advanced in Belgium, but the labor leaders are said to be generally disposed to adopt conciliatory methods and to avoid strike whenever possible. On the whole it may be said that labor troubles since the armistice have been far less alarming in Belgium than in most industrial countries."

All but 40 miles of the 1366 miles of railroads in Belgium destroyed during the war have been rebuilt. There is still an acute shortage of locomotives and

freight cars. Nevertheless, in September 60 per cent of the pre-war freight traffic had been resumed and 40 per cent of the passenger service.

Investigating Committee Reports

WASHINGTON, Nov. 25.—Chairman Graham of the special committee of the House of Representatives, which has been investigating War Department expenditures, has formally reported, asking Congress to order a review of a series of settlements made with Government contractors, under the Dent law. The bill also directs the Secretary of War to bring suits for the recovery of the money due the Government in the cases in which it may be found that the settlements were fraudulent or not according to the tenor and effect of that act.

The resolution is the result of a hearing by the subcommittee on ordnance of the special committee. The contracts investigated by the committee included: American Can Co., contract for hard bread cans; Henry Moss Co., contract for branding irons; Brier Hill Steel Co., contract for corrugated steel roofing; National Enameling & Stamping Co., contracts for boilers and kettles; Standard Steel Car Co., contract for 964 240-mm. howitzer carriages; Jones & Laughlin Steel Co., contract for by-product coke ovens; United Metals Selling Co., contract for copper.

"In all of these cases except the last two named," says Chairman Graham's report, "salvage values were fixed by Government agents and army officers on special facilities furnished by the Government, sometimes buildings and sometimes machinery and equipment, which were, in the opinion of the committee, insufficient and unjust to the Government. In some of the cases cited they seem to have been obviously tainted with fraud."

United States Displaces Germany in Exports of Machinery

WASHINGTON, Nov. 25.—The United States has displaced Germany as the chief exporter of machinery to Italy, according to a special report on the Italian machinery market made by W. C. Marshall. In 1913 Germany exported to Italy more machinery than all other nations combined. At that time the United Kingdom was second, Switzerland third, France fourth, Austria-Hungary fifth and the United States sixth. In 1918 Germany was out of the running. The United States was first, United Kingdom second and Switzerland third. Nearly all of the machinery trade of the United States was in the line of machine tools. According to Mr. Marshall there is no reason why the United States should not continue this trade.

Iron and Steel Markets

This issue, produced in three separate printing establishments, marks we believe the regular resumption of full weekly service to the readers of THE IRON AGE. The strike in the printing trades in New York, which began Sept. 30, is now fast collapsing, and workers in large numbers have been applying for positions in the past week.

In order to get back squarely to publishing regular issues on time, we have had to abandon the seven issues past due, those of Oct. 9, 16, 23 and 30 and of Nov. 6, 13 and 20.

A SCARCITY MARKET.

Large Railroad and Shipyard Business.

Buyers Put Prices Up by Competing for Material—Pig Iron Higher

The efforts of manufacturing consumers to provide against the scarcity of steel that is in sight for several months of 1920 and the policy of leading producers to keep from overselling and to hold prices in check continue to shape the market. Coal supply has become a more pressing problem, and as long as railroads keep on taking the steel companies' coal, even that which the latter are shipping from their own mines, there is no dependence on steel output.

In Illinois and Indiana four iron rolling mills have had to close down for lack of coal and others may soon reach that point. Generally the large steel companies have maintained output and there has been some further gain from the return to work of strikers.

Loss of output by the steel strike is estimated at 2,500,000 to 3,000,000 tons of finished material, and the outlook for a material increase over the present rate of production, with winter at hand, is not promising.

That there are buyers and sellers to whom the attempt to hold the market in bounds does not appeal appears from such quotations as \$50 for rerolling billets, \$65 for forging billets and \$63 for wire rods. Little business is done on any such basis, but premium transactions are likely to increase.

Railroad buying now comes up to compete for mill space with tonnage that was on the books before the strike. The Pennsylvania Railroad has decided to buy 200,000 tons of rails and have the price adjusted later. Deliveries run over 10 months. The Buffalo mill has already received 12,000 tons of this total and the remainder will go to Bethlehem, Cambria, Carnegie and Illinois Steel Co. mills. The Norfolk & Western is inquiring for 26,000 tons of 100-lb. rails. At Chicago pending rail business now amounts to about 300,000 tons.

Shipyard demand for plates is growing. Ships, tank work and cars recently let in the East mean 200,000 tons of shapes and plates. The Union Tank Car Co. has increased its order to 5500 cars, of which its own shops will build 500.

Structural business is expanding. Chicago has a 15,000-ton contract in the Corn Exchange and bank building just let, and at Philadelphia a 6000-ton award has been made. At Milwaukee an industrial building calls for 4700 tons and a Detroit bank will require 4500 tons.

While small lots of plates for nearby shipment are going at 2.70c. to 2.75c., Pittsburgh, the leading interest after selling in recent weeks to the Government at 2.50c. has set the same price on 6000 tons to a Baltimore shipbuilder. Steel bars for the first quarter command 2.85c. to 3c., against a nominal quotation of 2.35c. from large producers now out of the market for such shipment.

Offers of large premiums for sheets continue to be made, commonly \$20 per ton. At Pittsburgh the leading seller and some other producers are accepting contracts for sheets for the first quarter and for tin plates for the first half at present prices. In the Chicago district a sheet mill is booking orders for second quarter, on condition that specifications go with the order and that the price be that ruling at time of delivery.

Pig iron prices continue to advance, and while it is clear that the steel strike and the refusal of the miners to return to work are factors in the scarcity of iron and therefore in the upward movement of prices, it is likewise clear that consumers are extremely busy, some foundries having more orders than they can care for. It will be necessary to reline a number of blast furnaces and it will be impossible to re-establish normal production for a month or two.

At St. Louis an inquiry is out for 30,000 tons of basic iron, and at Canton, Ohio, for 10,000 tons, part of which has been bought. The scarcity of irons high in silicon has caused rapid advances in these grades. Bessemer ferrosilicon has been marked up \$2, following recent sharp advances.

American producers of ferromanganese are now asking \$120, delivered, while recent good sized sales were made at \$110. British producers are still out of this market. Heavy sales of spiegeleisen have been made and there is considerable inquiry, some of it for export. Germany has been able to get some spiegeleisen through Holland.

The scrap market is active and prices are soaring.

According to cable reports some British steel works are reducing shifts and refusing orders because of chaotic railroad conditions under government mismanagement. Sheet bars are advancing there and at \$61, with the prospect of a considerably higher price, American sheet bars could get in readily. But just now domestic mills have none to offer.

German makers are trying to sell wire and wire nails in the British market and on the score of price will probably succeed.

On 1000 tons of light rails for Spain an American quotation c.i.f. Barcelona was 72 francs per 100 kilos and Belgian quotations ranged from 56 to 60 francs.

Pittsburgh

PITTSBURGH, Nov. 25.

The local situation is still showing strong signs of a runaway market in pig iron, inquiry being heavy, and prices showing every sign of advancing still further. No large lots of Bessemer or basic have been closed in the last three or four days, but negotiations are on for between 30,000 to 40,000 tons of basic, and 10,000 to 15,000 tons of Bessemer. One local consumer is inquiring for about 15,000 tons of basic for first half delivery and probably will close on Tuesday or Wednesday. Sellers are not inclined now to accept contracts for basic at \$30 and for Bessemer at \$31.50, the prices in effect early last week, and are asking \$32 for

basic, and up to \$34 for Bessemer at Valley furnace. It is likely large tonnages in Bessemer and basic will be closed before this week ends at very close to \$32 for basic, and probably \$33 for Bessemer. Consumers seem very anxious to cover for first half, and are willing to pay prices now that they would not have thought of paying a month ago. There have been heavy sales of foundry iron for first quarter and first half delivery, and at prices in effect early last week. We note sales of upwards of 10,000 tons of Nos. 1, 2 and 3 foundry iron, all for first quarter and first half delivery, on the basis of \$31.50 for No. 3, \$32 for No. 2 and \$33.25 for No. 1, all at Valley furnace. Indications point to a higher pig iron market in the near future, as the demand for iron is heavy and the available supply for first quarter, at least, is limited. Furnaces are having to pay more for coke for first half of next year, and are now making sure of protecting themselves on future higher costs of making iron. Reports are that 1000 tons of Bessemer has sold at \$34, Valley, but if this was done, it was probably to a foundry user, and not for steel-making purposes. We continue to quote basic iron at \$30, Bessemer \$31.50, malleable \$32, No. 1 foundry \$33.25, No. 2 \$32, No. 3 \$31.50, gray forge \$31, all at valley furnace. It is likely sales of Bessemer and basic iron will be made within the next two or three days at higher than the above prices.

FERROALLOYS.—Another advance of \$2 a ton has been made on the lower grades of Bessemer ferrosilicon and silvery iron, two producers stating they have made heavy sales at the higher prices for first quarter and first half delivery. The demand is reported very active. Ferromanganese prices were advanced by domestic producers this week to \$120, delivered.

BILLETS AND SHEET BARS.—The situation is semi-finished. Steel is very tight, and none of the mills has any surplus steel to sell in the open market in either billets or sheet bars. It is said that close to \$45 has been paid for 4 x 4 in. open-hearth billets for prompt shipment. We have advanced prices on billets and sheet bars \$1 per ton over those in effect last week.

FINISHED MATERIAL.—The market on all kinds of finished iron and steel is active in demand, prices ruling very firm. In spite of efforts of subsidiaries of the Steel Corporation to hold the market at prices ruling since March of this year, higher prices are being offered on nearly all kinds of finished iron and steel for fairly prompt delivery, and the independent steel companies are not willing as yet to take contracts for finished steel products, for first quarter, and first half of next year, owing to unsettled conditions of labor, the coal strike, the probability of higher freight rates, and possibly high labor. The American Sheet & Tin Plate Co. is accepting contracts for sheets for first quarter and on tin plate for first half at present prices and it is said a few independent mills are doing the same. Premiums of as much as \$20 per ton for prompt shipment of sheets are still being offered by a few large consumers, mostly automobile builders, some of whom have had to cut down materially output of cars, owing to scarcity of sheets. The wire and nails market is active in demand. Some consumers, unable to get delivery from regular sources of supply, are offering premiums to other mills, but are being turned down. The demand for line pipe and oil well tubular goods is still extremely heavy, with mills sold up for six to eight months, or longer.

COKE.—The local market on coke is very firm, and some contracts have been closed for first half of next year. One large consumer has bought about 25,000 tons of standard grade furnace coke per month for first half on the basis of five and one-half tons of coke to one ton of basic iron. At the present price of \$30 Valley furnace for basic iron, this contract figures out to be producer slightly less than \$5.50 per net ton at oven for the coke. Another contract for about 15,000 tons per month for first half is reported to have been made at \$5.50 flat per net ton at oven. The demand for prompt furnace coke is active, and sales are being made every day at \$6 per net ton at oven. Inquiry for contract furnace coke for first half of next year is active. Some coke producers are insisting on inserting a clause in the contracts to take care of the coming advance in coal miners' wages, but furnaces are refusing to accept these contracts.

OLD MATERIAL.—A leading local consumer is reported to have bought in the past week or 10 days upwards of \$20,000 tons of selected heavy steel scrap, paying \$23 or higher, delivered. It is also reported that a leading consumer has bought a very large tonnage of shell forgings at \$26.50, delivered. Dealers state they could readily get \$23 delivered for heavy steel scrap, but are inclined to allow it to lay in their yard believing they will get higher prices later. It is said the available supply of scrap is heavy, and that dealers have large stocks in their yards, waiting for a higher market.

Philadelphia

PHILADELPHIA, Nov. 25.

PIG IRON.—The pig iron market continues in a state of anxiety on the part of consumers to cover their requirements both for immediate shipment and for first quarter and first half. Not much iron is now being sold, considering the volume of inquiry, but more tonnage has been quietly put on the books of the furnaces for first half during the last month or two than is generally supposed. One company has considerably more than 100,000 tons on order, though its monthly output is scarcely more than 10,000 tons, and more furnaces will have to be blown in to meet delivery promises. Another seller, with a little unsold iron on its hands, came into the market last week and obtained \$35, furnace, for No. 2 X iron with such ease that it quickly raised its price to \$36, selling some iron at that price, and then raised again to \$37. No sales have been made by this interest at the latter price, but another furnace has closed business on the basis of \$37, furnace, for No. 2 X. The leading Virginia interest has advanced its base price to \$35, for iron 1.75 to 2.25 per cent silicon, with the differentials which obtained under Government regulation for higher percentages of silicon and manganese. Another Virginia furnace has advanced its price \$2 to \$34, furnace, for iron 1.75 to 2.25 silicon. On Virginia iron analyzing 3.25 to 3.75 per cent silicon, a quotation of \$40, furnace, has been made. No further inquiry for basic iron is reported, but business probably could be negotiated at about \$32, furnace, the last reported sale of 15,000 tons having been made at \$31.25, delivered. Two lots of gray forge iron, one of 1000 tons, have been sold at new high prices of \$34 and \$35, furnace, with freight rate of \$1.10 added. Malleable is scarce and probably is not obtainable below \$35, furnace. Copper bearing low phosphorus iron has been advanced \$2 to \$37, furnace. More furnaces will come into blast as soon as the coal situation clears. The Alan Wood Iron & Steel Co. will blow in for the first time its new 600-ton furnace as soon as the coal situation permits. The Central Iron & Steel Co., Harrisburgh, is also preparing to put a furnace in on basic. Both of these interests will have some iron for sale.

FERROALLOYS.—Domestic makers of ferromanganese are now asking \$120, delivered, though a few sales on outstanding quotations have been made this week at \$110. Spiegeleisen has been sold in small lots at \$35, furnace, but higher prices are predicted.

SEMI-FINISHED MATERIAL.—Billets, slabs and sheets bars are hard to find. One Eastern company which recently raised its prices on semi-finished \$5 a ton is not now anxious to take business even at that advance. Therefore, \$43.50, Pittsburgh, appears to be the minimum, with the possibility that a mill having any steel to dispose of could obtain more.

FINISHED MATERIAL.—The Pennsylvania Railroad, having found steel companies unwilling a few weeks ago to quote a definite price on rails for delivery next year, has come back into the market with a willingness to accept open-price contracts. One or two such have been closed, and other mills are being urged to accept the business on the same basis. A total of 200,000 tons of 100 and 130-lb. open-hearth rails will be placed for delivery one-tenth each month during the first 10 months of 1920. The contract states that "the price is to be satisfactorily adjusted later." The Norfolk & Western Railroad has inquired for 26,000 tons of 100-lb. rails, but as the inquiry comes on the letterhead of the Railroad Administration, the mills have been slow in quoting until they ascertain whether the Railroad Administration or the road is actually to do the buying. The steel situation is marked by the increasing scarcity of products such as sheets, bars, pipe, wire

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron,

	Nov. 25, 1919	Nov. 18, 1919	Oct. 28, 1919	Nov. 26, 1918
Per Gross Ton:				
No. 2 X, Philadelphia	\$36.10	\$56.10	\$33.10	\$39.15
No. 2, Valley furnace	32.00	32.00	28.75	34.00
No. 2, Southern, Cin'ti	36.60	34.60	31.60	37.60
No. 2, Birmingham, Ala.	33.00	31.00	28.00	34.00
No. 2, furnace, Chicago	32.00	32.00	28.75	34.00
Basic, delf'd, eastern Pa.	31.25	31.25	28.00	36.00
Basic, Valley furnace	30.00	30.00	25.75	33.00
Bessemer, Pittsburgh	32.90	32.90	29.35	36.00
Malleable, Ch'go.	32.50	32.50	29.25	34.50
Malleable Valley	32.00	32.00	27.25	34.50
Gray forge, Pittsburgh	32.40	32.40	27.15	34.40
L. S. charcoal, Chicago	30.00	37.50	32.75	38.85

Rails, Billets, etc.,

Per Gross Ton:				
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	43.00	42.00	38.50	47.50
O.-h. billets, Pittsburgh	43.00	42.00	38.50	47.50
O.-h. sheet bars, P'gh.	46.00	45.00	42.00	51.00
Forging billets, base, P'h.	58.00	57.00	51.00	66.00
O.-h. billets, Phila.	47.50	47.50	47.50	51.50
Wire rods, Pittsburgh	55.00	55.00	52.00	57.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	3.245	3.245	2.995	3.745
Iron bars, Pittsburgh	3.25	3.10	2.75	3.50
Iron bars, Chicago	2.77	2.72	2.72	3.50
Steel bars, Pittsburgh	2.75	2.75	2.50	2.90
Steel bars, New York	3.12	3.02	2.77	3.17
Tank plates, Pittsburgh	2.65	2.65	2.65	3.25
Tank plates, New York	2.92	2.92	2.92	3.52
Beams, etc., Pittsburgh	2.45	2.45	2.45	3.00
Beams, etc., New York	2.72	2.72	2.72	3.27
Skelp, grooved steel, P'gh.	2.45	2.45	2.45	2.90
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	3.25
Steel hoops, Pittsburgh	3.25	3.25	3.05	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,

	Nov. 25, 1919	Nov. 18, 1919	Oct. 28, 1919	Nov. 26, 1918
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.35	4.35	4.35	5.00
Sheets, galv. No. 28, P'gh.	5.70	5.70	5.70	6.25
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Plain wire, P'gh.	3.10	3.10	3.85	3.25
Barbed wire, galv., P'gh.	4.25	4.25	4.25	4.35

Old Material,

Per Gross Ton:				
Carwheels, Chicago	\$30.00	\$28.00	\$25.50	\$29.00
Carwheels, Philadelphia	30.00	28.00	24.50	29.00
Heavy steel scrap, Pittsburgh	23.00	23.00	19.00	28.00
Heavy steel scrap, Phila.	21.50	20.50	20.00	27.00
Heavy steel scrap, Ch'go.	20.50	18.00	18.00	27.00
No. 1 cast, Pittsburgh	28.00	28.00	24.00	29.00
No. 1 cast, Philadelphia	29.00	29.00	26.00	29.00
No. 1 cast, Ch'go (net ton)	29.50	28.50	25.50	27.00
No. 1 RR. wrot, Phila.	30.00	28.00	27.50	34.00
No. 1 RR. wrot, Ch'go (net)	23.00	23.00	19.50	28.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	\$6.00	\$6.00	\$5.50	\$6.00
Furnace coke, future	6.00	6.00	6.00	6.00
Foundry coke, prompt	7.00	7.00	7.00	7.00
Foundry coke, future	7.00	7.00	6.50	7.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.50	20.50	22.25	26.00
Electrolytic copper, N. Y.	19.00	20.00	21.75	26.00
Spelter, St. Louis	7.85	7.95	7.75	8.30
Spelter, New York	8.20	8.30	8.10	8.65
Lead St. Louis	6.55	6.55	6.50	7.75
Lead, New York	6.75	6.80	6.75	8.05
Tin, New York	54.12½	53.87½	56.75	71.00
Antimony (Asiatic), N. Y.	9.25	9.25	8.75	8.50
Tin plate, 100-lb. box, P'gh.	\$7.00	\$7.00	\$7.00	\$7.75

products and semi-finished material, and now even plates and shapes are becoming more difficult to obtain for early delivery. One Eastern plate mill is quoting 10 or 12 weeks delivery, and sold 1000 tons for February shipment, without difficulty, at 2.90c, mill, equivalent to 2.75c, Pittsburgh. There is an increasing demand from plates from all sources, but particularly from the shipyards. One plate company has taken an order for 15,000 tons of hull plates. A Pittsburgh company has taken 6000 tons from an Eastern shipyard at a price reported to be 2.50c, Pittsburgh. However, a majority of sales are being made at 2.65c to 2.75c, at least two more mills now quoting the latter price on small tonnages. A Baltimore shipyard has inquired for 10,000 tons of plates and shapes and a Bristol, Pa., shipyard wants 16,000 tons of plates and shapes. A Camden, N. J., yard has a new contract for a 15,000-ton boat, and steel will be required soon. Steel bars have been sold by a re-rolling mill at 3.65c., Pittsburgh, while one large producer is getting 3c. and 3.25c., for such lots as it is willing to sell. Merchant stocks of wire rods have brought high prices, \$60, Pittsburgh, having been obtained for Bessemer rods and \$72, f.a.s. New York, on a lot of open-hearth rods for export. Hard rods have been sold at \$75 and are being quoted as high as \$90.

OLD MATERIAL.—Dealers report a real scarcity of scrap. An Eastern consumer has been scouring the country for carload lots of heavy melting steel. Heavy steel scrap has been sold from this district for delivery in the Pittsburgh district at \$24. Re-rolling rails, railroad wrought and other grades are up \$1 to \$3 a ton.

Chicago

CHICAGO, Nov. 25.

The scarcity of coal has forced bar iron rolling mills at West Pullman and Riverdale, Ill., Vincennes, Ind., and Terre Haute to shut down. Other mills will soon reach the point where they will be obliged to close although some of them are purchasing coking coal for steam purposes and are having coal delivered by motor truck from nearby coal dealers in an effort to keep running.

FINISHED MATERIAL.—In finished products, the market is decidedly favorable to the sellers with the larger interests exerting a restraining influence on upward price tendencies. Both the leading interest and the foremost independent are booking business for next year at 2.45c. Pittsburgh for shapes and 2.65c. for plates. The former continues to accept orders for mild steel bars at 2.35c. Pittsburgh. The leading independent is booking order for sheets for second quarter delivery on the condition that specifications are filed with the orders and the prices ruling at the time of shipment are paid. Bar iron and rail carbon bars continue to gather strength, the lowest quotation on the former now being 2.75c. Chicago, and on the latter 2.85c. mill. The leading interest will furnish 15,000 tons for a building to be constructed here for the Consolidated Corn Exchange, Illinois Trust and Merchant's Loan and Trust Bank. It has also taken 3,200 tons of plates from a Pacific Coast shipbuilder and expects an additional tonnage of plates and shapes from the same source. Fabricating jobs in prospect include 4,700 tons for an addition to the A. O. Smith Co. plant, Milwaukee, 4,500 tons for the First and Old National Bank Building, Detroit; 800 tons for a bascule bridge to be built by the Wabash at Detroit, and 640 tons for a power house to be constructed for the Continental Motors Corporation at Muckegon, Mich. A foundry now being designed for Fairbanks, Morse & Co., to be erected at Beloit, Wis., will require about 6,000 tons of fabricated material. The Worden-Allen Co., Milwaukee, will furnish about 900 tons of reinforcing bars for the construction of a \$1,000,000 food products plant to be erected for Uihlein Brothers, Milwaukee. An addition to the May Building, Cleveland, will involve 1,500 tons of fabricated material. Rail orders, which the leading interest has in prospect, now total 300,000 tons. A proportional tonnage of track fastenings is also expected. There is an increasing scarcity of billets. The foremost interest has not advanced its prices but exacts the full Chicago price plus the freight rate to the point of delivery, whereas formerly in the case of purchases by consumers located East of here it met the competition of Eastern mills.

Among recent orders which it has booked are 1,500 tons of re-rolling billets.

PIG IRON.—Pig iron continues to advance. Two important Southern sellers which recently withdrew from the market are again taking business. One of these has taken orders for 5,000 tons and 1,000 tons on a \$33 Birmingham base for first quarter delivery and the other has booked 3,000 tons for prompt shipment on a \$34 base. A 1000-ton order for malleable casting for December and first quarter delivery has been sold at \$38 Valley furnace. Buffalo foundry has been sold here at \$35 base furnace, to which a freight of \$4.30 is added. A St. Louis steel mill is inquiring for 30,000 tons of basic. The leading Northern producer continues out of the market but is steadily increasing its output, having put on a third Iroquois furnace last week. Charcoal iron is again advancing with most current quotations at \$40 furnace and the lowest \$39. Silvery is difficult to obtain, but a Tennessee producer is now quoting 7 per cent material for December and first half delivery at \$45.75 furnace or \$49.15 Chicago. Spiegeleisen and ferromanganese are stronger, having advanced to \$45 furnace and \$120 delivered respectively. Several hundred tons of ferromanganese were sold last week at the old price of \$110 but no purchases can now be made at that figure.

CAST IRON PIPE.—Some cast iron pipe business is being placed at premiums over the ruling prices. The United States Cast Iron Pipe & Foundry Co. has been awarded 700 tons of pipe by Witt, Ill. Toledo receives bids on 3300 tons today and Elyria, Ohio, will take bids on from 5000 to 7000 tons Dec. 1.

New York

NEW YORK, NOV. 25.

PIG IRON.—The demand continues to be very strong and prices are still advancing, until now the minimum on No. 2 X foundry iron in eastern and central Pennsylvania seems to be \$36, furnace, while as high as \$39.25 has been quoted by a Buffalo furnace for spot delivery. Some eastern Pennsylvania iron has been sold as high as \$37 for No. 2 X. Evidence accumulates to show that while the coal strike is a factor in the present scarcity of pig iron, there is a very strong demand due to foundries being extremely busy. It is evident that some furnaces which have been banked during the steel strike will require relining and that the production of iron for some time will not be up to normal. Several furnaces which are ready to blow in are delaying on account of inability to obtain coke and others will be compelled to go out if the miners do not soon return to work. Owing to the high prices now prevailing and the unsatisfactory condition of the exchange market, little interest is manifested in export business.

FINISHED IRON AND STEEL.—A wild situation exists as regards prices. It follows, of course, that the total amount of business done is a small percentage of the total capacity of the country. The relatively few mills which are thought to be in a position to make deliveries are pressed to take on commitments, even under the offers of premiums. The condition applies also to semi-finished steel and optimism everywhere prevails in selling offices for with all the definite unsatisfied demand from manufacturing consumers and jobbers, there remains a large dammed up total for the railroads not yet on the market. Steel bars in two or three months command 2.85c. to 3c., Pittsburgh, and one mill sparingly agreeing to extend occasional first quarter contracts considers that it could if it would obtain large tonnages at 3.50c., Pittsburgh. While one large buyer of plates claims that it can still get 2.50c. on plates, it remains that sizeable lots are going at 2.70c. and 2.75c. and recent shipbuilding tank building and car orders call for about 200,000 tons of plates and shapes. Structural steel demand remains good with new fabricated steel projects coming to light from day to day. The Union Tank Car Co.'s operations now involve a total of 5,500 cars to 10,000 gal. capacity, of which 3,500 were placed with the Standard Steel Car Co., 750 each to the Pressed Steel Car Co. and Cambria Steel Co., with 500 to be built in the company's own shops. On an order that the company placed for 4,500 cars in 1917 deliveries were not completed until this

year. On rerolling billets a quotation of \$50, Pittsburgh, has been made on a 1,000-ton lot and sales have been made at \$45. On wire rods \$63 has been quoted and \$65 on forging billets. Another producer of bolts and nuts has come to the level of prices named in the Philadelphia market last week and is asking 5.60c. base on 200-keg lots of track bolts and 6.50c. on smaller lots, though it is believed that railroads can purchase at 1c. less than these prices. The general run of sizes of bar iron are put at 3c., Pittsburgh, with the smaller sizes at a 4c. base and flats over 6 in. at 3.30c. base. Fabricated steel awards include 600 tons for a boiler house for the Standard Oil Co. in Ohio to the American Bridge Co.; 1,100 tons for a department store, Springfield, Mass., to Levering & Garrigues Co.; 300 tons column cores for a Philadelphia building to the Phoenix Bridge Works; 6,000 tons for the Atlantic Refining Co., Philadelphia, to the American Bridge Co.; 500 tons for an apartment in Baltimore to the Chesapeake Iron Works, while the Haas Building in New York went to the Levering & Garrigues Co. The Tennessee Copper & Chemical Corporation is inquiring for a total of 1,600 tons at several points and the 1,500 tons for the Navy at Charleston, W. Va., has been extended for letting in December.

FERROALLOYS.—American producers of ferromanganese are now asking \$120, delivered for all future business. In the past week sales have been made aggregating 1,000 to 2,000 tons, all at \$110, delivered, and there is still before the market substantial inquiries for delivery next year, most of which is expected to be consummated at the new price. So far as can be learned British producers are still absent from the market and confirmation is unobtainable of the report from Pittsburgh that sales of about 1,000 tons of British alloy have been made at \$100, seaboard. Pronounced activity continues to characterize the spiegeleisen market. Sales of nearly 6,000 tons have been made to domestic consumers and there are still a number of inquiries unsatisfied, besides considerable business for export still under negotiation. Most of the sales referred to have been made at \$36, furnace, which we quote as the market for the higher grade alloy, although one other producer is asking \$45. Ferrosilicon, 50 per cent, is quoted at \$80 to \$85 per ton, delivered. There is a fairly active market.

CAST IRON PIPE.—Inquiries for next year are beginning to come forth and in some instances sales are being made at \$1 higher than for this year. Though pig iron and scrap have accorded marked advances in price, pipe manufacturers are loath to raise prices, at least for this year, lest municipalities be discouraged from public lettings. Orders are many and molders are scarce. We quote 6-in. and heavier at \$58.30, New York; 4-in. \$61.30, with \$2 additional for class A and gas pipe.

OLD MATERIAL.—No week since the armistice has seen a greater raise in prices than the past week, some grades having jumped as much as \$3.50. Buying is chiefly by brokers who are purchasing for speculative purposes. Consumers are not expected to buy on a large scale until about the middle of January. A New York broker sold to a Pittsburgh broker heavy melting steel at \$24, delivered, and No. 1 railroad wrought at \$30. No. 1 machinery cast has been delivered to nearby foundries for as high as \$31. The dealers' buying price of railroad malleable cast has jumped from \$17.50 to \$21. We have marked up prices on 20 grades.

Cincinnati

CINCINNATI, NOV. 25.

PIG IRON.—Practically all foundry iron in the Birmingham and southern Ohio districts has disappeared, with the exception of some odd lots of high silicon iron that is bringing a premium. Not a furnace in either district is willing to quote for next year's shipment, although the first part of last week some Southern foundry was sold at \$31, Birmingham, but the same concern advanced its quotation before the end of the week to \$32. The last lot of Northern foundry sold brought \$34.75, Ironton, silicon 1.75 to 2.25. No more of this iron is to be had for any shipment. Inquiry for foundry iron is quite heavy for first and second quarter shipment, showing that melters are by no means as well supplied as has generally been thought. Some 8 per

cent Ohio silvery iron brought \$50 at furnace last week. A limited tonnage of Valley foundry iron was sold in this territory last week at \$34, furnace. Malleable is still very difficult to obtain and a southern Ohio furnace obtained \$36.25 for a small lot last week for first quarter shipment.

COKE.—There is a better demand for furnace coke in the Connellsville field and foundry grades are also wanted. Although there have been no advances in spot shipment quotations, Connellsville coke ranges from \$5.75 to \$6 and foundry from \$7 to \$7.50. A little foundry coke is bringing from \$8.50 to \$9 at ovens. New River foundry is from \$11 to \$11.50.

OLD MATERIAL.—The scrap market continues rather quiet as the coal shortage has cut down operations of Indiana rolling mills and has also affected mills in other districts. The car situation is still unsatisfactory. Dealers report no changes in quotations with the exception of cast borings which have made a small advance.

Buffalo

BUFFALO, NOV. 24.

PIG IRON.—Demand continues heavy for all grades, but the market is growing tighter and even small tonnages are becoming very scarce for last quarter delivery and prices are rising. Sales are limited to ability of furnaces to furnish iron, all being out of the market for 1919. Practically nothing but resale iron, or accommodation shipments of a carload or so to relieve the stress of old customers, is procurable. One of the largest blast furnace plants of the district has been closed several weeks as a result of the iron and steel workers' strike and this has limited the supply. Advances in price are caused by the scarcity of coke and still higher prices for all grades are expected. One producer sold a total of 6500 tons of basic during the week for first half delivery at an advance over last week's schedule; but the market stiffened and the company is now quoting \$36 furnace. Furnaces that have anything to sell are now asking \$1 to \$2 per ton over last week's prices.

FINISHED IRON AND STEEL.—Agencies have grown even more conservative in their offerings than they were a week ago, due to the continued labor troubles in the coal regions. Some mills that had partly resumed operation will be forced to close again unless the coal strike ends quickly. There are clear indications that independent mills are going to adopt their own schedule of prices and are not conforming to the Steel Corporations' prices. With the increased cost of production, the outlook is that prices will be very irregular. One of the results of the continued coal strike is the offering of premiums on the part of buyers for all kinds of steel products, especially wire, sheets and tin plate.

OLD MATERIAL.—The market continues strong and active. Heavy melting steel has again advanced \$1 per ton and is now held at \$21 to \$22. In at least one instance, an offer of \$22.50 was rejected by seller. Dealers are holding back on sales of material in yards, being confident of further advances, of which they wish to reap the full benefit.

Low phosphorus is also up \$1 per ton, with very limited tonnage to be had. There is good demand for machine shop turnings and for cast borings at full schedule prices and machinery cast scrap has advanced to \$29.50 and railroad malleable to \$23 to \$24. Dealers expect an early resumption of a very active market with quotations considerably above present figures. A local consumer who came into the market last week for 25,000 tons of heavy melting has secured only a small portion of it and of an aggregate inquiry for 100,000 tons, but very little has been obtained.

Cleveland

CLEVELAND, NOV. 25.

PIG IRON.—Prices continue to advance, but there is considerable irregularity in quotations. The demand is still heavy for foundry grades and basic is fairly active. One interest sold a large tonnage of foundry iron during the week, some at \$32 and the remainder at the price that is prevailing for December and January delivery. Another advanced its price to \$33, at which it booked considerable tonnage and withdrew from the market. However, No. 2 foundry has sold at

\$34 for the first half and \$34.75 for early delivery. Sales of basic are reported at \$31 and \$31.50, but several producers are now asking \$33. Basic inquiries include 10,000 tons for Canton delivery, a part of which has been placed, and 20,000 tons from a St. Louis consumer. Much of the demand for foundry iron from the Detroit territory, recent inquiries aggregating 100,000 tons, remains unsatisfied. Southern pig iron is being offered by one producer at \$33 for 1.75 to 2.25 silicon.

FINISHED MATERIAL.—Inquiry for steel for the first quarter and first half is very heavy, and consumers are urging mills to accept specifications for any delivery they can make. Plate offerings have become very light and an Eastern mill is taking orders at 2.75c., mill, for delivery in eight to ten weeks. Consumers are offering to pay almost any price for sheets. A Cleveland mill is accepting orders for sheets and light plates subject to prices prevailing at time of shipment. The coal strike is beginning to affect Ohio steel plants, and some sheet mills have curtailed production and ordered shipments of sheet bars suspended. Hard steel bars are in heavy demand, prices ranging from 2.75c. to 3.25c.

COKE.—There is considerable activity in foundry coke, which is being sold at \$6.75 to \$7 for the first half and \$7 for prompt shipment for standard Connellsville makes.

OLD MATERIAL.—There is a heavy demand for cast scrap owing to the scarcity of pig iron and this grade has become very scarce. Other grades are not active, but the market is very firm and prices have further advanced on many grades. Heavy melting steel is quiet.

St. Louis

ST. LOUIS, NOV. 24.

PIG IRON.—The buying of pig iron for prompt and first half delivery during the past week has continued active on the part of foundries, but the big consumers of basic are still out of the market because of lack of orders and heavy stocks in the yards put there during operation under government direction. The sales to foundrymen during the week have aggregated between 5,000 and 10,000 tons, with Southern sales on a basis of approximately \$33 Birmingham. The local furnace is also booking orders on a basis of the prices noted last week with individual transactions largely controlling the quotations. All melters expect a continuance of active business and are now concerned only with the problem of getting coke, which, however, they hope will be relieved by a settlement of the coal strike.

COKE.—The coke market has shown very little activity, as most melters are well supplied under contract, although they are somewhat concerned as to deliveries, having been advised by oven representatives that the further continuance of the coal strike is likely to interfere with shipments.

FINISHED IRON AND STEEL.—Stock out of warehouse is moving as fast as supplies will permit, but substitution still continues because of the shortage of material coming in from the mills.

OLD MATERIAL.—The scrap dealers are beginning to hesitate a little as a result of the continuance of the coal strike, and its interference with industry. In consequence, prices have begun to soften somewhat, although it is not yet possible to report any definite change in quotations, because transactions are not being carried on in sufficient volume to establish a change in the market.

Birmingham

BIRMINGHAM, ALA., NOV. 24.

PIG IRON.—By Nov. 20 the Birmingham iron market had advanced to \$32 for spot and 1920 with the silicon differentials maintained. On Nov. 21 a large interest, which sold a big tonnage at \$32 and got out of the market, announced its new price at \$33. This new level will probably be the minimum before the week ends just as \$32 was after Nov. 20. Considerable tonnage went at \$32 both in the Middle West and in the South. The demand was never stronger. Prediction of \$49 is freely made and seems plausible. The Tennessee company weathered the coal strike without shutting down a stack. It has six at Ensley and one Alice on basic, one at Bessemer on foundry and one at Bessemer on ferro-

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Pittsburgh

Pig Iron

The following quotations are all per gross ton at Valley furnaces, freight rate for delivery in the Cleveland and Pittsburgh districts being \$1.40 per ton.

Basic	\$30.00
Bessemer	31.50
Gray forge	31.00
No. 2 foundry	32.00
No. 3 foundry	31.50
Malleable	32.00

Ferroalloys

We quote 78 to 82 per cent domestic ferromanganese \$120 delivered, and English at \$102 to \$105, with a reduction of \$1.50 to \$1.75 per unit for lower percentages. We quote resale 50 per cent ferrosilicon at \$80 to \$82 and 18 to 22 per cent spiegeleisen at \$33 to \$35, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, \$54.75; 10 per cent, \$56.75; 11 per cent, \$60.05; 12 per cent, \$63.35. We quote 6 per cent silvery iron, \$43.75; 7 per cent, \$45.25; 8 per cent, \$47.25; 9 per cent, \$49.75, and 10 per cent, \$51.75. An advance of \$3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of \$2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Stratsville, Ohio, which have a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

Billets and Sheet Bars

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$43 to \$45; 2 x 2 in. billets at \$45 to \$47; slabs, \$47 to \$48; sheet bars, \$45 to \$47, and forging billets, \$58 to \$60 base, all f.o.b. at mill Pittsburgh or Youngstown.

Iron and Steel Bars

We quote steel bars rolled from billets at 2.75c. and from old steel rails, 2.45c. Pittsburgh mills rolling iron bars quote at 3.25c. Pittsburgh, plus full freight rate to point of delivery.

Structural Material

Beams and channels up to 15-in., 2.45c., Pittsburgh, large lots.

Plates

Sheared tank plates, 1/4-in. and heavier, at 2.65c. to 2.75c. Pittsburgh, depending on order and delivery.

Spikes

We quote standard spikes, 9/16 x 4 1/2 in., at \$3.35 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, 3/4 in., 7/16 in. and smaller, at \$3.85 to \$4 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, \$3.85 to \$4 per 100 lb. in carload lots of 200 kegs of 200 lb. each, all f.o.b. Pittsburgh. For less than carloads 1c. per lb. higher is asked.

Cold Rolled Strip Steel

We quote cold rolled steel at \$5.65 base per 100 lb. f.o.b. Pittsburgh, for 1 1/2-in. and wider, 0.1000 in. and thicker hard tempered in coils 0.20 carbon and under. Boxing charge, 25c. per 100 lb.

Old Material

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$23.00 to \$24.00
No. 1 cast for steel plants	27.00 to 28.00
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	29.00 to 30.00
Compressed steel	18.00 to 19.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	17.00 to 18.00
Bundled steel stamping	15.00 to 15.50
No. 1 busheling	22.00 to 23.00
Railroad grate bars	20.50 to 21.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) 1/4 in. and heavier	26.00 to 26.50
Railroad malleable	22.00 to 23.00
Iron car axles	31.00 to 32.00
Locomotive axles, steel	31.00 to 32.00
Steel car axles	28.00 to 29.00
Railroad malleable	22.00 to 23.00
Cast iron wheels	25.50 to 26.00
Rolled steel wheels	24.00 to 25.00
Machine shop turnings	13.00 to 14.00
Sheet bar, crop ends (at origin)	26.00 to 27.00
Heavy breakable cast	21.50 to 21.75
Cast iron borings	17.00 to 17.50
No. 1 railroad wrought	23.00 to 24.00

Chicago

Pig Iron

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnaces and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average silicon, 1.50, f.o.b. furnace, average freight to Chicago, \$2.50 (other grades subject to usual differentials)	\$39.00
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	34.25
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	32.00
Northern high phosphorus foundry	32.00
Southern coke, No. 1 foundry and No. 1 soft, silicon, 2.75 to 3.25	40.70
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	39.35
Southern foundry, silicon, 1.75 to 2.25	38.00
Malleable, not over 2.25 silicon	32.50
Basic	31.00
Low phosphorus (copper free)	40.00
Silvery, 7 per cent	49.15

Plates

The mill quotation is 2.65c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Structural Material

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote \$3.47 for materials out of warehouse.

Ferroalloys

We quote 80 per cent ferromanganese at \$120 delivered, 50 per cent ferrosilicon at \$85 delivered; spiegeleisen, 18 to 22 per cent, \$45 furnace.

Iron and Steel Bars

Mill prices are: Mild steel bars, 2.35c. Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.75c. to 3c. Chicago; rail carbon, 2.85c. to 3c. mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Cast Iron Pipe

We quote per net ton f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$62.80; 6-in. and above, \$59.80; class A and gas pipe, \$2 extra.

Bolts and Nuts

Jobbers quote: Structural rivets, 4.72c.; boiler rivets, 4.82c.; machine bolts up to 3/4 x 4 in., 35 and 5 per cent off, larger sizes, 25 and 5 off; carriage bolts up to 3/4 x 6 in., 30 off; larger sizes, 20 off; hot pressed nuts, square tapped and hexagon tapped, \$1.45 off; coach or lag screws, gimlet points, square heads, 40 and 5 per cent off. Quantity extras are unchanged.

Sheets

Mill quotations are 4.35c. for No. 28 black, 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized.

Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.57c.; No. 28 black, 5.62c., and No. 28 galvanized, 6.97c.

Rails and Track Supplies

Standard railroad spikes, 3.35c. Pittsburgh. Track bolts with square nuts, 4.35c. Pittsburgh. Steel tie plates and iron angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 2.90c. f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Old Material

We quote delivery in buyer's yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	\$27.00 to \$28.00
Relaying rails	40.00 to 50.00
Car wheels	30.00 to 31.00
Steel rails, re-rolling	31.00 to 32.00
Steel rails less than 3 ft.	25.00 to 25.50
Heavy melting steel	20.50 to 21.50
Frogs, switches and guards, cut apart	20.50 to 21.50
Shoveling steel	20.50 to 21.00

Per Net Ton

Iron angles and splice bars	\$26.00 to \$27.00
Steel angle bars	21.00 to 21.50
Iron arch bars and transoms	27.50 to 28.50
Iron car axles	32.00 to 33.00
Steel car axles	29.50 to 30.00
No. 1 busheling	18.50 to 19.00
No. 2 busheling	13.75 to 14.25
Cut forge	20.50 to 21.00
Pipes and flues	17.00 to 17.50
No. 1 railroad wrought	23.00 to 24.00
No. 2 railroad wrought	20.50 to 21.00
Steel knuckles and couplers	21.00 to 21.50
Coil springs	22.50 to 23.00
No. 1 cast	29.50 to 30.00
Boiler punchings	23.50 to 24.00
Locomotive tires, smooth	20.50 to 21.00
Machine shop turnings	10.50 to 11.00
Cast borings	11.50 to 12.50
Stove plate	23.50 to 24.50
Grate bars	24.50 to 25.50
Brake shoes	20.50 to 21.50
Railroad malleable	24.00 to 25.00
Agricultural malleable	24.00 to 25.00
Country mixed	16.50 to 17.50

Philadelphia

Pig Iron

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Penna., No. 2X, 2.25 to 2.75 sil.	\$36.10 to \$37.00
Eastern Penna., No. 2 plain, 1.75 to 2.25 sil.	35.10 to 36.60
Virginia No. 2 X, 2.25 to 2.75 sil.	39.10 to 40.35
Virginia No. 2, plain, 1.75 to 2.25 sil.	38.10 to 39.10
Basic, delivered Eastern Penna.	31.25 to 34.30
Gray forge	35.10 to 36.10
Standard low phosphorus (f.o.b. furnace)	40.00
Malleable	36.00 to 37.00
Copper bearing low phosphorus (f.o.b. furnace)	37.00

Old Material

No. 1 heavy melting steel	\$21.50 to \$22.50
Steel rails, re-rolling	31.00 to 32.00
No. 1 low phosphorus, heavy, 0.04 and under	27.00 to 28.00
Car wheels	30.00 to 31.00
No. 1 railroad wrought	25.00 to 26.00
No. 1 yard wrought	17.50 to 18.50
No. 1 forge fire	17.50 to 18.50
Bundled skeleton	17.50 to 18.50
No. 1 busheling	18.00 to 19.00
No. 2 busheling	16.50 to 17.50
Turnings (short shoveling grade for blast furnace use)	17.00 to 18.00
Mixed borings and turnings (for blast furnace use)	15.50 to 16.00
Machine shop turnings (for rolling mill and steel works use)	18.00 to 19.00
Heavy axle turnings (or equivalent)	19.00 to 20.00
Cast borings (for rolling mills)	21.00 to 22.00
Cast borings (for chemical plant use)	23.00 to 25.00
No. 1 cast	29.00 to 30.00
Railroad grate bars	24.00 to 25.00
Stove plate	22.50 to 23.50
Railroad malleable	22.00 to 23.00
Wrought iron and soft steel pipes and tubes (new specifications)	21.00 to 22.00
Ungraded pipe	17.00 to 18.00

Birmingham

Pig Iron

Foundry, silicon 1.75 to 2.25	\$33.00
Basic	32.00

Old Material

Steel rails	\$20.00 to \$21.00
No. 1 heavy steel	19.00 to 20.00
Cast iron borings	14.00 to 15.00
Machine shop turnings	14.00 to 15.00
Stove plate	22.00 to 23.00
No. 1 cast	24.00 to 25.00
Car wheels	24.00 to 25.00
Tramcar wheels	23.00 to 24.00
Steel axles	26.00 to 27.00
No. 1 wrought	21.00 to 22.00

Buffalo

Pig Iron

No. 1 foundry, 2.75 to 3.25 silicon	\$37.00 to \$39.00
No. 2 X, 2.25 to 2.75 silicon	35.25 to 37.25
No. 2 plain foundry, 1.75 to 2.25 silicon	34.00 to 36.00
Malleable, silicon not over 2.25	36.25
Basic	36.00
Lake Superior charcoal, regular grades, f.o.b. Buffalo	38.40

Old Material

Heavy melting steel, regular grades	\$22.50 to \$23.00
Low phosphorus, 0.04 and under	26.00 to 27.00
No. 1 railroad wrought	25.00 to 26.00
No. 1 machinery cast	29.00 to 29.50
Iron axles	33.00 to 34.00
Steel axles	33.00 to 34.00
Car wheels	26.50 to 27.50
Railroad malleable	23.00 to 24.00
Machine shop turnings	13.50 to 14.00
Heavy axle turnings	18.50 to 19.50
Clean cast borings	16.50 to 17.00
Iron rails	28.00 to 29.00
Locomotive grate bars	22.00 to 22.50
Stove plate	23.00 to 23.50
Wrought pipe	18.50 to 19.00
No. 1 busheling	18.50 to 19.00
Bundled sheet stamping	16.00 to 17.00

New York

Pig Iron

No. 1 foundry, silicon 2.75 to 3.25	\$38.80
No. 2 X, silicon 2.25 to 2.75	37.80
No. 2 plain, silicon 1.75 to 2.25	36.80
No. 2 X, Virginia, silicon 2.25 to 2.75	39.40

Finished Iron and Steel

We quote as follows for mill shipments: Bar iron, refined grade, 3.27c.; soft steel bars, 3.12c.; shapes, 2.72c.; plates, 2.92c.; all New York.

Old Material

Heavy melting steel	\$17.00 to \$18.00
Rerolling rails	26.00 to 27.00
Relaying rails, nominal	45.00 to 46.00
Steel car axles	26.00 to 27.00
Iron car axles	37.00 to 38.00
No. 1 railroad wrought	26.00 to 27.00
Wrought iron track	19.50 to 20.00
Forge fire	14.00 to 14.50
No. 1 yard wrought, long	20.00 to 20.50
Light iron	6.00 to 7.00
Cast borings (clean)	17.00 to 17.50
Machine-shop turnings	13.50 to 14.00
Mixed borings and turnings	12.50 to 13.00
Iron and steel pipe (1 in. min. diam., not under 2 ft. long)	17.00 to 17.50
Stove plate	19.00 to 20.00
Locomotive grate bars	22.00 to 22.50
Malleable cast (railroad)	21.00 to 22.50
Old carwheels	26.00 to 27.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	29.00 to 30.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	28.00 to 29.00
No. 1 heavy cast not cupola size	20.00 to 21.00
No. 2 cast (radiators, cast boilers, etc.)	19.00 to 20.00

Cleveland

Iron Ore

Old range Bessemer, \$6.45; old range non-Bessemer, \$5.70; Mesaba Bessemer, \$6.20; Mesaba non-Bessemer, \$5.55.

Pig Iron

Basic	\$31.40 to \$32.40
Northern No. 2 foundry, silicon 1.75 to 2.25	32.40
Southern foundry, silicon, 2.25 to 2.75	39.35
Gray forge	31.40
Ohio silvery, silicon, 8 per cent	52.40
Standard low phos., Valley furnace	\$38.00 to 40.00

Finished Iron and Steel

Steel bars, 3.25c.; plates, 3.57c.; structural shapes, 3.37c.; bands and hoops, 3.97c.; No. 10 blue annealed sheets, 4.27c.; No. 28 black sheets, 5.27c.; No. 28 galvanized sheets, 6.62c.

Old Material

Heavy melting steel	\$20.75 to \$21.25
Steel rails, under 3 ft.	5.00 to 26.00
Steel rails, re-rolling	29.00 to 30.00
Iron rails	29.00 to 30.00
Iron car axles	35.00 to 36.00
Steel car axles	33.00 to 34.00
Low phosphorus melting scrap	22.50
Cast borings	15.75 to 16.00
Iron and steel turnings and drillings	12.75 to 13.00
Short turnings (for blast furnaces)	14.00 to 14.50
Compressed steel	17.75 to 18.00
No. 1 railroad wrought	22.00 to 23.00
Railroad malleable	24.00 to 25.00
Agricultural malleable	20.00 to 21.00
Steel axle turnings	17.00 to 17.50
Light bundled sheet scrap	14.50 to 15.00
No. 1 cast	28.00 to 29.00
No. 1 busheling	20.00 to 21.00
Drop forge flashings, 10 in. and under	18.50 to 19.50
Drop forge flashings, over 10 in.	16.50 to 17.00
Railroad grate bars	23.00 to 24.00
Stove plate	23.00 to 24.00

Cincinnati

Pig Iron

Based on freight rates of \$3.60 from Birmingham and \$1.50 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, silicon 1.75 to 2.25 (base price)	\$36.60
Southern coke, silicon 2.25 to 2.75 (No. 2 soft)	37.00
Ohio silvery, 8 per cent silicon	51.80
Southern Ohio coke, silicon 1.75 to 2.25 (No. 2)	36.55
Basic, Northern	36.05
Standard Southern car wheel	48.60
Malleable	38.05

Old Material

Per Gross Ton

Bundled sheet	\$13.00 to \$13.50
Old iron rails	23.50 to 24.00
Relaying rails, 50 lb. and up	41.00 to 42.00
Rerolling steel rails	21.50 to 22.00
Heavy melting steel	16.00 to 17.00
Steel rails for melting	17.00 to 18.00
Old car wheels	19.00 to 19.50
No. 1 railroad wrought	18.50 to 19.00

Per Net Ton

Cast borings	\$10.50 to \$11.00
Steel turnings	8.00 to 8.25
Railroad cast	21.00 to 21.50
No. 1 machinery	23.00 to 23.50
Burnt scrap	14.00 to 15.00
Iron axles	25.00 to 25.50
Locomotive tires (smooth inside)	19.00 to 19.50
Pipes and flues	14.50 to 15.00
Malleable cast	16.50 to 17.00
Railroad tank and sheet	13.00 to 13.50

St. Louis

Old Material

Per Gross Ton

Old iron rails	\$27.50 to \$28.00
Old steel rails, rerolling	31.00 to 31.50
Old steel rails, less than 3 ft.	25.00 to 25.50
Relaying rails, standard sections, subject to inspection	38.00 to 45.00
Old car wheels	26.00 to 26.50
No. 1 railroad heavy melting steel	21.50 to 22.00
Heavy shoveling steel	19.50 to 20.00
Ordinary shoveling steel	19.00 to 19.50
Frogs, switches and guards, cut apart	21.50 to 22.00
Ordinary bundled sheets	13.00 to 13.50
Heavy axle and tire turnings	15.50 to 16.00

Per Net Ton

Iron angle bars	\$24.00 to \$24.50
Ordinary bundled sheets	13.00 to 13.50
Iron car axles	32.50 to 33.00
Steel car axles	32.00 to 32.50
Wrought arch bars and transoms	27.00 to 27.50
No. 1 railroad wrought	23.00 to 23.50
No. 2 railroad wrought	22.00 to 22.50
Railroad springs	21.00 to 21.50
Steel couplers and knuckles	21.00 to 21.50
Locomotive tires, 42 in. and over, smooth inside	21.00 to 21.50
No. 1 dealers' forge	20.50 to 21.00
Cast iron borings	12.50 to 13.00
No. 1 bushelings	20.50 to 21.00
No. 1 boiler, cut to sheets and rings	17.00 to 17.50
No. 1 railroad cast	27.50 to 28.00
Stove plate and light cast	24.50 to 25.00
Railroad malleable	21.50 to 22.00
Agricultural malleable	20.50 to 21.00
Pipes and flues	18.50 to 19.00
Heavy railroad sheet and tank	17.00 to 17.50
Machine shop turnings	12.50 to 13.00
Country mixed	17.00 to 17.50
Uncut railroad mixed	18.50 to 19.00
Horseshoes	22.00 to 22.50

Boston

Pig Iron

Eastern Pa., No. 2 X silicon 2.25 to 2.75	\$39.90 to \$40.15
Eastern Pa., No. 2 plain silicon 1.75 to 2.25	38.90 to 39.15
Buffalo No. 2 X silicon 2.25 to 2.75	38.90 to 39.15
Buffalo No. 2 plain silicon 1.75 to 2.25	37.90 to 38.15
Virginia No. 2 X silicon 2.25 to 2.75	39.95 to 40.95
Virginia No. 2 plain silicon 1.75 to 2.25	38.70 to 39.70
Alabama No. 2 plain silicon 1.75 to 2.25	39.00 to 40.00
Alabama silicon 2.25 to 2.75	41.00 to 43.00

Old Material

No. 1 heavy melting steel	\$18.00 to \$19.00
No. 1 railroad wrought	24.00 to 24.50
No. 1 yard wrought	18.00 to 19.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	16.50 to 17.00
Machine-shop turnings	13.50 to 14.00
Cast iron borings	15.50 to 16.00
Heavy axle turnings	14.50 to 15.00
Blast furnace borings and turnings	11.50 to 12.00
Forge scrap	13.50 to 14.00
Bundled skeleton	13.50 to 14.50
Steel car axles	22.00 to 23.00
Carwheels	25.00 to 25.50
Machinery cast	29.00 to 30.00
No. 2 cast	25.00 to 26.00
Stove plate	19.50 to 20.00
Railroad malleable	17.50 to 18.00
Rerolling rails	24.00 to 24.50

Tool Steel

Jobbers quote: Ordinary tool steel, 16c. per lb. base; extra, 19c. base; special, 24c. base; double special, 66c. base; non-changeable, 36c. base; high speed steel, \$1.50 base. Mill shipments are quoted at 1c. per lb. less.

Warehouse Prices

Jobbers quote: Steel bars, cold rolled rounds, \$5 per 100 lb. base; squares, hexagons, flats, \$5.50 base; soft steel, flats, rounds squares, \$3.55 to \$3.65 base; structural steel, \$3.55 to \$3.65; tire steel, \$4.25 to \$4.50; spring steel, open hearth, \$8; special, \$12; toe calk steel, \$5.50; steel hoops, \$5 to \$5.25; steel bands, \$4.75 to \$4.85; best iron flats, rounds and squares, \$5.50 base; refined iron, \$3.65 to \$3.75; No. 10 blue annealed sheets, \$5.10; No. 28 black sheets, \$7.15; No. 28 galvanized sheets, \$8.50; plates, \$3.95.

IRON AND STEEL MARKETS

(Continued from page 1089)

manganese. The Sloss-Sheffield company banked a North Birmingham stack and blew out one at Sheffield for relining. Coal production at the close of the week had attained about 80 per cent. All pipe shops are operating at near capacity. Stove plants report similar conditions.

Scrap has become a trifle more active and the new price list is strong. Houston has sent in large orders for flange pipe for oil wells.

The Tennessee company is making the first shipment of Fairfield steel to the shipbuilding plant at Mobile via the Warrior river, using steel magnets at Tuscaloosa, where delivery is made to barges.

Boston

BOSTON, Nov. 25.

PIG IRON.—Prices are \$1 to \$2 higher owing largely to scarcity of offerings. Few local agents have any first half iron to offer, business during the past week being confined to small lots for prompt shipment and iron running high in silicon. A Connecticut consumer bought 200 tons of No. 2 X for prompt delivery on a \$39.40 delivered base. Six hundred tons was sold to textile interests at \$36, furnace. Three hundred tons of iron, of 3 per cent and over silicon, for prompt delivery, sold in car lots at \$39 to \$40, furnace. Boston interests bought 100 tons of Buffalo 2.75 to 3.25 silicon iron for spot delivery at \$35, furnace. Lake Superior charcoal sold to Western Massachusetts consumers at \$37.50 and to a Connecticut melter at \$38. A Pittsburgh consumer wants 100 tons, silicon 3.50, for prompt delivery.

COKE.—There is a heavy demand for coke already contracted for. New England coke is reported a little behind on deliveries. There is moderate buying of prompt and first quarter at former prices. Sliding scale prices have been withdrawn owing to confusion among buyers. Koppers by-product is selling at \$7, furnace.

OLD MATERIAL.—Excellent buying of cast scrap by New England foundries prevails and the market is \$2 higher. Eastern Pennsylvania furnaces are heavy buyers of heavy melting steel and borings and turnings and this market is from \$1 to \$2 higher. Inquiries for pipe have caused prices for this grade to stiffen.

TOOL STEEL.—The demand has been spasmodic during the past week, on some days being excellent, while on others amounting to almost nothing. One of the largest local interests reports getting supplies through in sufficient quantities to keep stocks in good condition. It is believed the other interests have been less fortunate owing to the inability of mills to secure regular supplies of coal and raw materials.

FINISHED IRON AND STEEL.—The Boston & Maine Railroad, during the past week, has bought a considerable tonnage of plates for use in car repair shops. It is understood the management contemplates further purchases. The Laconia, N. H., car works has bought several hundred tons of plates. The Bethlehem shipbuilding plant at Quincy, Mass., is in the market for plates to be used in connection with the construction of a large Government boat. In fact, the plate business seems to be excellent just now. The Lukens Steel Co. is quoting on a 2.75c., Pittsburgh base, but the other companies are holding at 2.65c. At least one large plate contract is expected to be closed within the next week. No large structural tonnages have been placed since last reports, the market being unusually quiet, but very strong. Every indication here points to a material advance in prices at an early date. About the only uncovered contract is one for something more than 100 tons for a tool machine plant.

WAREHOUSE BUSINESS.—Local warehouse prices on blue annealed sheets have been advanced 25c. per 100 lb., and those on black sheets \$1.15 and on galvanized sheets \$1.25. Stocks of all kinds of sheets are uncomfortably low. Plates have been marked up 25c. per 100 lb. and to a \$3.95 base. Some firms are so low on certain sizes of steel that they have had to resort to substitution of iron. An occasional car of iron and steel is received, but stock is going out of warehouses faster than it is

coming in. Stove and tire bolt prices have been advanced 10 to 12½ per cent, but those on other kinds of bolts remain unchanged.

Metal Markets

THE WEEK'S PRICES

Cents Per Pound For Early Delivery							
Nov.	New York		Tin New York	Lead		Spot	
	Lake	Electrolytic		New York	St. Louis	New York	St. Louis
19	20.25	19.75	53.25	6.75	6.55	8.25	7.90
20	20.00	19.50	53.37½	6.75	6.55	8.15	7.80
21	19.75	19.25	53.50	6.75	6.55	8.10	7.75
22	19.75	19.25	—	6.75	6.55	8.10	7.75
24	19.62½	19.12½	54.12½	6.75	6.55	8.15	7.80
25	19.50	19.00	54.12½	6.75	6.55	8.20	7.85

New York

New York, Nov. 25.

Electrolytic copper can be bought as low as 19c., New York, for this year's delivery with Lake copper nominal at about 19.50c., New York. These lower levels have been the result of fairly active competition among both large and small sellers for the meager business offered. The minimum quotation of some producers is 19.25c., New York, for electrolytic for early delivery. Liberal sales of tin, aggregating about 1,000 tons and largely for future shipment from the East, have been the feature of the market. Both consumers and dealers were the buyers and prices ranged from 52.12½c. to 52.75c. Not much prompt tin has been sold but prices have advanced until today spot Straits is quoted at 54c. to 54.25c., New York. Present quotations on future shipment are higher at 54c. from England and from the East. The lead market has been quiet and firm at 6.75c., New York, or 6.55c., St. Louis, with business light and no anxiety to buy. The zinc market is featureless and quiet and has been influenced largely by export demand and the fluctuations in exchange rates. Prime Western for this year's delivery is quoted at about 7.85c., St. Louis, or 8.20c., New York. Antimony is unchanged at 9.25c., New York, duty paid, for wholesale lots for early delivery, and virgin aluminum is still obtainable at 32c. to 33c., New York.

Railroad Chaos in Britain.

Steel Works Reducing Shifts—Sheet Bar Prices Soaring

LONDON, ENGLAND, Nov. 24.—(By Cable)—In pig iron licensing of exports has been abolished, but it has been non-effective because of the shortage of supplies of foundry grades. Scottish molders now threaten to strike. English molders are still idle. Government control of railroads is slowly strangling transport by ineptitude and mismanagement. Cleveland steel works are reducing shifts and refusing orders owing to the railroad chaos.

Billets have been sold at £15 10s. and sheet bars have been nominally £15. Tin plates are strong at 46 to 47s. f.o.b. The government is asking the makers' association for cost sheets to justify present prices. Makers who also produce sheet bars intend raising bar prices £2 to £3, and £15 s. has been paid, while £17 to £17 10s. has been spoken of as likely. Pacific salmon packers are asking for 100,000 boxes for January-March shipment. For galvanized sheets £38 10s. has been paid. Makers talk of £40. Most makers have withdrawn.

Germany is offering steel wire and wire nails in the British market.

Prices on Bolts and Nuts

There are now some variations in the prices of bolts and nuts, manufacturers in the Chicago and Eastern territories quoting prices slightly higher than those obtaining in the Pittsburgh district.

The Osborn Casting Co., manufacturer of warm air furnace castings, Racine, Wis., has closed contracts for extensions and additions which will practically double its capacity for the year 1920.

Effects of Steel Strike Disappearing

Plants in all Districts Showing Increased Activity—Citizens of Youngstown Start Movement Against Radicals

Operations are fast being resumed in the districts that were most seriously affected by the steel strike, including the Wheeling, West Va., Youngstown, Ohio, and Johnstown, Pa. districts. In the Wheeling district are the blast furnaces and steel plants of the National Tube Co. and the Wheeling Steel & Iron Co., while almost across the Ohio River are the Bellaire and Mingo Junction blast furnaces and steel plants of the Carnegie Steel Co. When the steel strike started on Sept. 22, all these plants were closed. They have since remained idle, but in the last week or more, the men on strike have become very restless over being idle so long, and are showing a strong desire to get back to work. The National Tube Co. has not made any attempt to start its Riverside furnaces, steel works, or pipe mills at Wheeling, but the Wheeling Steel & Iron Co. has made a partial start, and this is also true of the Carnegie Steel Co. plants at Bellaire and Mingo Junction. Some blast furnaces have been started at both places, and the steel plants are also in partial operation, more men desiring to return to work than can be handled, largely for the reason that on account of the plants being idle so long certain repairs are necessary before they can operate. Included in the Wheeling district is the LaBelle Iron Works at Steubenville, Ohio. This concern closed its two blast furnaces, steel works, pipe and sheet mills, and also its by-product coke plant when the strike started, and made no attempt to operate. Recently, 500 or more men employed by the LaBelle Iron Works voted to return to work, and the company is gradually resuming operations. It is fully believed that by the first of the year nearly all the blast furnaces and steel works in the districts named above will be in operation to nearly normal capacity. The only thing that would prevent this would be a shortage of men, mostly semi-skilled and common labor. When the strike started, hundreds of men, doing semi-skilled and common laboring work, who had saved a little money decided to go back to their native lands, and have left this country. This has caused a decided shortage in these kinds of labor.

Continued Improvement at Youngstown

In the Youngstown district, steel plants continue to improve their operating schedules despite the coal shortage, which threatens to curtail output. Managers are bending every energy to fill coal requirements, but despite this fact a considerable tonnage is being diverted by the railroads, even coal mined by their steel companies on their own property.

With resumption of the Bessemer department of the Republic Iron & Steel Co., after two months' idleness, all three Bessemer plants in the Mahoning Valley are operating. Sixteen blast furnaces are in blast out of 25, 64 per cent numerically, but a much higher percentage in productive capacity. While the productive furnaces are rated at 7800 tons, they have produced in excess of 8000 tons in 24 hours in recent operations. Of the nine idle furnaces, three are being relined.

At the beginning of the week, steel was being tapped from 44 open hearth furnaces. Valley sheet mills started at 65 per cent of normal capacity. At the DeForest works of the Republic Iron & Steel Co., eight sheet and two jobbing mills are running, 100 per cent, while the Western Reserve works of the Brier Hill Steel Co. is also operating full. At every sheet plant, two or more stands of rolls are breaking down sheet bars. The Sharon Steel Hoop Co.'s Mahoning valley works is at 80 per cent.

Following a favorable vote, between 600 and 700 men returned to the Ohio Galvanizing Co. and the Stanley Works, tool manufacturers, which had been closed for eight weeks. Both plants are in Niles, Trum-

bull county. Schedules are near normal at the Girard, O., plant of the A. M. Byers Co., Pittsburgh. Tube mill output registered an appreciable advance in the past week.

The only factor to retard steady improvement in operations is the coal situation.

With the blowing in of No. 4 furnace at Sharon, Pa., the Carnegie Steel Co.'s works there and in Farrell, Pa., are at 100 per cent.

Movement Against Radicals

YOUNGSTOWN, OHIO, Nov. 25.—Sentiment directed against radical union organizers charged with responsibility for the disturbance to industry in the Mahoning valley crystallized into action during the past week, when petitions were circulated and freely signed protesting against the presence and influence of the men held primarily answerable. The petitions, which originated in business circles, are aimed at J. E. McCadden, district organizer for the American Federation of Labor, and S. T. Hammersmark, secretary of the steel unions, both of whom were strangers to this locality until the strike agitation commenced. The petitions recite that existing conditions are "unendurable". After the documents have been generally signed, they will be published in local newspapers. The purpose of publication will be to convey to the community the fact that an overwhelming number of people stand for law and order and are opposed to the Bolshevik or any other malcontents, whose movements may lead to industrial turmoil.

The new organization will choose officers and will employ counsel to prosecute pickets who assault workmen or illegally interfere with them in any way.

Nov. 22, 14 men who declared they represented employees of the open hearth department of the Republic Iron & Steel Co., waited upon the acting mayor of the city and demanded better protection while going to and coming from work. They cited many instances of unlawful molestation.

Stating that he represented a "committee of business men", Joseph N. Higley, president of city council, requested city officials to notify William Z. Foster, secretary-treasurer of the national committee of the A. F. of L. for organizing iron and steel workers, to remain away from the city, or, if that were illegal, to notify him to make his stay as brief as possible.

Smaller Mills Closing in Chicago District

CHICAGO, Nov. 24.—Barring an early resumption of coal mining, most of the bar iron and rail carbon bar rolling mills in this district will soon be idle. Two important plants, one a local bar iron mill and the other a hard steel bar mill located in the western part of the state, have already shut down. Other mills will be forced to close by the end of the current week unless a prompt settlement of the strike is effected. In the Chicago metropolitan zone, the Highland Iron & Steel Co. discontinued operation on Nov. 21, after five days of work following a previous shut-down of one week. The Interstate Iron & Steel Co. will operate its East Chicago mill at least until the middle of the week, and longer, if additional coal in transit is delivered. Its Grand Crossing wire works and its South Chicago steel plant have fuel on hand for about a week's operation. The bar iron mill of the Republic Iron & Steel Co., at East Chicago, has sufficient coal to insure operation until the middle of next week, while the Calumet Steel Co. expects to keep its Chicago Heights hard steel mill running until the close of the month.

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Higher Steel Prices

In spite of the sustained policy of large steel producers, practiced as well as affirmed, to resist the price-raising pressure of buyers, signs point to higher price levels early next year. The one possible check, a decided curtailment in demand, is not discernible on today's horizon, however vividly one may recall the suddenness with which wholesale cancellations can change the aspect to one of substantial overproduction. Everything at the moment indicates maintained buying activity in the face of obstacles to the return to normal mill efficiency and capacity and in the face of order books filled fully as far as sellers consider wise.

It is hardly necessary to enumerate the problems which must be met by operating officials to bring smooth running out of the chaos of the strike idleness, with working forces unequal to the needs in numbers, in familiarity with mill conditions and in skill. Time must necessarily elapse before pre-strike, let alone large scale, outputs can be promised; and then expected advances in fuel and in transportation costs stand out as arguments likely to be brought forward to justify acceptance of premium offers of more or less insistent buyers. Were demand measurably subnormal, these added increments of cost would doubtless be forgotten in the quest for business. But if week-to-week transactions should be put through at higher than the schedules of recent months, the market records of THE IRON AGE would have to recognize the new figures in its tables, as against any lower prices which would actually obtain only on shipments in the relatively distant future. This is as it always has been. Indeed, at the moment, some lines of finished steel are moved at higher prices than those quoted by leading makers; the latter are nominal so far as early deliveries are concerned.

That the large producers will have a hard time maintaining the levels to which they have been adhering is the view commonly taken in current comment in the trade. Manufacturing consumers of steel, jobbers, and even the salesmen of companies which have taken a stand against higher prices, see ahead a stretch of months in which

there will not be enough steel to go around. One thing to be said about such a forecast is that too many in the trade have accepted it as the obvious consequence of present conditions. It is the uncounted factor—the factor that is not in sight, or the factor that is overlooked because the average mind seizes on the plain indications—that often becomes the determining one industrially and financially. Without now going into the possibilities in the European situation or in the financial situation at home that might give something different in 1920 from the scarcity of American steel, which now dominates all forecasts, we suggest that the present is no time for speculation for a rise in iron and steel values. If consumers are wise they will recognize that there is an obligation upon them as well as upon the producers to prevent such speculation. For some months the problem of equitable distribution, of apportioning the available steel so that it will come into the hands of those most entitled to it and give the largest employment to labor, will be enough to tax the best minds in the trade.

The Exchange Situation

The seriousness of the exchange situation which is interfering with the sale of American products to foreign countries, particularly England, France and Belgium, is being impressed upon manufacturers by the members of the Allied trade and financial commissions which have been visiting the leading cities of the United States since the Atlantic City convention. At a recent meeting in Chicago, M. Canon-Legrand, referring to the needs of his country, said that before the war Belgium always preferred American machine tools to those of German make. Although the prices were higher, the quality of the tools was better. Since the war, he said, owing to the increased original costs, unequal rates of exchange and high ocean freight rates, Belgium has found it impossible to buy in this country as it wishes to do, and Germany is offering the Belgian dealers tools at pre-war prices, which, with the exchange rate in favor of the Belgian franc as against the mark, make attractive bargains. The Germans also guarantee delivery within two or three weeks as

compared with the American promise of four to six months.

Eugene Schneider, the distinguished steel master of France, said at the Chicago meeting that if the exchange problem is not solved, France will be compelled to seek materials in other countries than the United States. He expressed the belief that the solution of the problem is long-term credits and he declared that the question of how these credits ought to be arranged is for the bankers to determine; "but it is up to us," he said, "to push our bankers to arrange them without delay."

Some bankers, notably those who attended a recent financial conference in Chicago, promised their support to such financial measures as may be developed for the restoration of normal conditions of trade and commerce, but there is a lack of definiteness in these promises and the actual progress that has been made in meeting the condition which confronts us is rather discouraging. In the meantime, reports from England indicate that the usual media of exchange are being replaced in some international dealings in Europe by a system of barter. A newspaper cable says that even Germany is being favored in some bartering that has been going on, while Belgium will send 50,000 tons of coal to Roumania in exchange for corn. Prices have been arranged without regard to market values as expressed in the currencies of the respective countries, the commodities being exchanged purely on a barter basis.

On the whole, the outlook is that the use of barter will be adopted to an extent that until recently did not seem possible. While it is an ancient method of doing business, it is a welcome offset to some part at least of the curtailment of foreign commerce, due to the dislocations of currencies and credit. It is highly desirable, as the members of the visiting commissions point out, that means be found of making it possible for Europe to keep on doing business with the United States. But the fact cannot be blinked that long-time credits can be arranged only with the greatest difficulty and at high cost, and that the average investor in the United States is not tying up his money in that way. Even the \$250,000,000 British loan has not met with the success expected. The level of values for European bills will be raised chiefly through the increase of European production and of sales to the United States. That is the wholesome and really the only effective way. Long-time credits are necessary palliatives, but they are only palliatives, not remedies.

One of the principal troubles of the present industrial situation is that so many employees imagine that by doing less they can get more; that is, by loafing a large part of the time they can make more money and benefit themselves in other ways. Until everybody realizes the importance of a larger production and each does his share in increasing that production, there will be men and women who will retard the return to normal conditions and prevent the reduction of the high cost of living. That there is a shortage of labor and that many foreign born are returning to their native lands with their savings is apparent to the most casual observer. It is

also clear that to reduce the cost of living there must be a great deal more work and more efficient work, so that both the quality and quantity of production will be increased. These simple facts cannot be too vigorously brought home. Some manufacturers are doing their part in this kind of education, but a great deal remains to be done.

A Flood of Technical Papers

At the technical meetings held at Chicago in the last week of September, probably a record was made in the number of papers presented on iron and steel subjects alone, saying nothing of those in other lines. At the sessions of the American Institute of Mining and Metallurgical Engineers at least 24 papers on iron and steel were presented, besides a half dozen on steel and allied subjects before the American Electrochemical Society and the Exposition of Chemical Industries, a session on pyrometry alone, lasting a whole day, had an array of 53 papers, of which 35 were presented by the authors or their representatives. Thirty-nine papers, of which 14 were read by title only, were offered at the technical sessions of the first convention and exhibition of the American Steel Treating Society.

In all, at least 120 papers on iron and steel and allied topics were scheduled for the three Chicago conventions. A week later at Philadelphia American foundrymen were offered a total of 42 papers, spread over four days of sessions on iron and steel foundry problems. This summary does not include 19 papers on the program of the American Institute of Metals for sessions in conjunction with these Chicago and Philadelphia meetings.

While many papers in these long lists were of a high order of merit, the question arises whether the effort to produce a large volume of literature for every such meeting has not been overdone. From those who attend the remark is often heard that there is too much to absorb. It can hardly be contended that any subject is so important that 53 papers should be scheduled for consideration at a single meeting.

The matter is serious enough to suggest to the managers of these various societies whether programs should not be curtailed, perhaps decidedly. It is generally conceded that two important benefits should be the result of such meetings—a discussion of papers and an interchange of views and the making of new acquaintances. In many cases at Chicago, where sessions were held morning, afternoon and evening, though not so much at Philadelphia, programs had to be rushed through, affording inadequate time for fruitful discussion. The papers can be read by the members at their leisure in most cases, many of them before the sessions, but the real benefit is the exchange of views on the floor of the convention. In most cases discussions of prominent papers should have several leaders pre-arranged for. Too often an excessive amount of time is consumed in presenting the papers. There is danger that this really vital part of the work of our leading technical societies may be made ineffective through straining after volume, unless some reform is instituted.

BASING POINT HEARING

Three Groups of Varied Views Will Be Represented at Washington

WASHINGTON, Nov. 25.—The Federal Trade Commission has announced that the hearing to be held December 2 on the Pittsburgh basing point controversy will not be governed by any strict lines of evidence. The commission insists that, so far, it is only an inquiry in which no formal complaint has been issued, and in which even the question of jurisdiction is undecided. For that reason all parties interested will have opportunity, not only to be heard, but to participate in the general questioning. To prevent undue extension of the sessions, however, and a confusion of the records, it is likely that the various groups will be asked to name spokesmen for their views. Three definite lines of cleavage have already been established in the answers and letters which the commission has already received. First, there is the group, headed by the United States Steel Corporation and the other large producers in the Pittsburgh district, who want the Pittsburgh basing point continued. Then there is a second group, which asks that additional basing points be established either at Chicago or Birmingham, or both. The third group demands the entire abolition of the basing point rule.

Various interests who have announced their intention of participating in the hearings, with their representatives, so far as they have notified the commission, are as follows:

American Iron and Steel and Heavy Hardware Association, New York.—A. H. Chamberlain, secretary.
Commercial Club of Superior.—H. G. Chickering.
Interstate Steel Co.—Newman, Pappenhusen, Stern & Johnston.
Hercules Cement Corporation.—C. R. MacCarey.
Pittsburgh Steel Co.—John Bindley, president.
Chamber of Commerce of Chattanooga, Tenn.—Chas. W. Howard, manager.
Civic Organizations of Duluth.—Chas. P. Craig.
Western Association of Rolled Steel Consumers.—John S. Miller, attorney.
American Association of Engineers, Indianapolis Branch.—Daniel R. Luten.
Youngstown Sheet & Tube Co.—L. A. Manchester, attorney.
Crawfordsville Wire & Nail Co.—C. D. Voris, general manager.
Reading Iron Co.—L. E. Thomas, president.
Eastern Steel Co., Pottsville, Pa.—E. L. Herndon, treasurer.
Lackawanna Steel Co.—C. R. Robinson, first vice-president; Cadwalader, Wickersham & Taft, attorneys.
Stanley Works, New Britain, Conn.—R. W. Poteet, traffic manager.
Southern Hardware Jobbers.—John Downan, secretary-treasurer.
Carnegie Steel Co.—H. F. Knapp.
Birmingham Steel Corporation.—Chester W. Cathell.
Gulf States Steel Co., Birmingham.—Jas. Bowron.
Cambria Steel Co.—and Midvale Steel & Ordnance Co.—Chadbourne, Babbitt & Wallace, attorneys.
Kokomo Steel & Wire Co.—J. E. Frederick, secretary.
Alan Wood Iron & Steel Co., Philadelphia.—C. O. Hadley, assistant general manager of sales.
Donner Steel Co., Philadelphia.—W. H. Donner.
United States Steel Corporation.—Wm. H. Corlett, general solicitor.
Weirton Steel Co., Weirton, W. Va.—Chas. M. Thorp.
Mansfield Sheet & Tin Plate Co.—F. W. Beach, general manager of sales.
Oscar Daniels Co., Tampa, Fla.—Chas. L. Ortenfeldt, chief engineer.
Southern Association of Rolled Steel Consumers.—C. L. Harold, secretary.
Jones & Laughlin Steel Co., Pittsburgh.—Willis L. King.
Central Iron & Steel Co., Pittsburgh.—L. D. Perry.
Republic Iron & Steel Co., Youngstown, O.—Richard Jones, attorney.
War Department.—Lt.-Col. L. D. Miller, Division of Purchase, Storage & Traffic.
Eastern Bar Iron Institute, New York.—Albert C. Taylor.
Western Association of Tin Plate Manufacturers; and the National Pipe and Supplies Association, Pittsburgh.—Geo. L. McIlvain, secretary.
Southern Metal Trades Association.—W. E. Dunn, secretary.
Bethlehem Steel Co.—Cravath & Henderson, attorneys.
Inland Steel Co.—H. R. Platt, counsel; L. E. Block, chairman, and G. R. Jones, first vice-president.
F. G. Taylor Co., Inc., Philadelphia.
W. A. Collins, Kansas City, Mo.
M. B. Farrin Lumber Co., Cincinnati.—Wm. J. Eckman, vice-president.

Will Enlarge Ferroalloys Plant

The York Metal & Alloy Co., York, Pa., has increased its capital stock from \$50,000 to \$250,000 principally to finance the purchase of the Yucca Tungsten Mining Co., near Yucca, Ariz. The company is constantly enlarging its works and is now establishing a

branch for the manufacture of ferrotungsten, ferromolybdenum, ferrovanadium and ferrouranium. It expects to have its furnaces in operation within two or three weeks. The new department is known as the York Ferroalloys Co., and has a paid-up capital of \$50,000. Robert W. Emerton is president, George J. Haenn is vice-president, and George Harlow is secretary and treasurer.

High Premiums for Sheets

YOUNGSTOWN, OHIO, Nov. 25.—Both domestic and export buyers are flooding the valley with inquiries for light-gage galvanized sheets and offering premiums said to range as high as \$20 above market quotations for spot delivery. Emphasizing the demand is the fact that buyers' representatives have come personally into the market in larger numbers than ever before. There is practically no available tonnage, however, as mills, still operating below normal, are filling orders on the books held up by the strike. There is enough of this business to require capacity rollings well into the first quarter, and one maker states he is booked up to the first of March. Manufacturers of containers of all kinds are especially urgent for material. Jobbers say they have dealers who will buy blue annealed at any reasonable price. Sharp advances in sheet bars are also deterring sheet producers who cannot roll their own semi-finished material, from booking business. One sale of sheet bars approximating \$53 is reported, though this is said to have been an exceptional case.

Will Build Large Foundry

Fairbanks, Morse & Co., manufacturer of cranes, engines, pumps and machinery, Chicago, will erect a \$1,500,000 foundry at Beloit, Wis. The building will be 550 x 900 ft., and will contain 495,000 sq. ft. of floor space. The completed foundry will have a capacity of 400 tons of gray iron daily. Seventy electric cranes will move material to and from the eight cupolas which will be installed. Electric grab buckets will unload the molding and core sand and coke. Magnets will be used to remove the pig iron from the cars. The plans also provide for a ventilation system which will change the air in the foundry every 15 min., individual lockers for all workers, hot and cold showers for the entire force, and a modern cafeteria where the men can secure hot meals. C. A. Hardy, consulting engineer, Railway Exchange Building, Chicago, will design the plant.

American Radiator Co. Plans for Extensive Additions

The American Radiator Co., Chicago, has purchased about 600,000 sq. ft. in Dorchester, Mass., and plans to erect a large warehouse of at least two stories, covering approximately 100,000 sq. ft., and costing about \$1,500,000. When the warehouse is completed, the company plans to build units until six acres of land are covered with buildings. When the plants are in full operation 3000 men will be employed. The management figures the output of the new plant will be between 75,000,000 and 85,000,000 lb. of freight per annum.

Government Will Sell Boiler Plant

The United States Shipping Board Emergency Fleet Corporation, Philadelphia, is offering for sale the plant at Richmond, Va., intended as a boiler manufacturing plant with a capacity of 200 boilers per year. In addition to the boiler shop, which is 160 x 600 ft. in area, the plant consists of a power house, a small building for electric locomotive repairing and charging station, a service building, an office building and a garage. When the work is completed on the plant, the cost will be about \$2,050,000. Machinery ordered for the plant, some of which has been delivered, will cost about \$950,000.

The Pollak Steel Co. is having plans prepared for a large addition to its South Chicago, Ill., forging plant.

SELLING MACHINE TOOLS

Policy of Government in Disposing of Surplus at Home and Abroad

WASHINGTON, Nov. 25.—Despite pressure from the manufacturers of machine tools, the Director of Sales of the War Department has issued an announcement that the American purchasers will have first opportunity to buy Government surplus machine tools. A portion of this surplus has already been sold in Belgium, and negotiations are pending for further sales in France. At the same time E. C. Morse, Director of Sales, gave out a general statement concerning the sale of surplus supplies for export.

"My attention," says Mr. Morse, in discussing the machine tool situation, "has recently been invited to the pressure that is being brought by members of the National Machine Tool Builders' Association upon members of Congress to have the legislative branch of the Government direct the War Department to attempt to market as large a part as possible of its surplus of machine tools in European countries.

"The War Department has a large stock of surplus machine tools. It is attempting to market those tools to the best advantage of the Government, and, with this object in view, is offering machine tools for sale both at home and abroad. By contract, dated Sept. 5 last, it sold to the Belgian manufacturers, in whose interest the Belgian Government had established considerable credit through American financiers, more than 2500 machine tools, which are now being selected by Belgian representatives and put in transit; it is negotiating with the French Government for the sale of an additional large number of machine tools held by the War Department in the United States. But there is a strong demand on the part of American users of machine tools for certain types of tools of which the department has a stock. The American manufacturers need these tools to increase their production and enhance the wealth of the nation. They are willing to pay good prices for those which they desire to acquire. The War Department stands ready to sell its surplus stock of machine tools to those domestic users. It is filling its machine tool orders in the sequence of their receipt. No machine tool is being held off the market to be applied on the Belgian contract. Tools are consigned to that contract only after they have been actually selected by the Belgian representatives.

"The surplus supplies held by the War Department were acquired with funds furnished by the American people; the War Department proposes to give the American people the opportunity to derive any benefit that may inure to them through the sale of these surplus stocks.

"In view of concerted attempts made by certain industries to divert particular stocks of war materials from the domestic to the export market, the Director of Sales takes this opportunity to state briefly the sales policy that controls the disposition of surplus supplies for foreign consumption.

"Full and adequate opportunity is afforded the American public to acquire the surplus supply of each and every commodity and material held by the War Department before attempt is made to dispose of any part of the surplus for export purposes. The export market is developed only for those surplus stocks the supply of which exceeds the quantity that the domestic market is capable of consuming, or for which, because of the manner of manufacture, there is no demand except that existing in foreign markets.

"In offering its surplus war materials for sale to foreign governments or peoples, the War Department does not extend to the foreign buyer any terms of sale which are not afforded domestic consumers, except in a few instances, a period of credit. The exception as to credit is not made to any foreign buyer who purchases with a view to reselling at a profit, but is granted only to distributing agencies which, set up for relief purposes and acting under governmental sanction, provide a channel through which the commodities or materials may reach the ultimate consumer. Preference as to price and selection is given the domestic buyer.

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"The disturbed state of labor and unreasonable weather have seriously curtailed the production of raw material in the United States, with the result that stocks of both raw and finished products are extremely low in the nation's primary markets. As a consequence, the domestic demand for practically all of the surplus war materials held by the War Department is so strong as to make domestic orders for these stocks more attractive than those which are being received to-day from foreign countries."

Facts About the Coal Strike

The Geological Survey has now completed its figures for the second week of the coal strike, including four days during which the strike order had been rescinded and the strike presumably had been ended. The figures reveal that the rescinding of the strike order really made little difference in the output. The production of coke, however, was unprecedentedly large, an unusual percentage of the bituminous coal output being coked.

The production of bituminous coal during the second week of the strike, according to the Geological Survey figures, was 33.0 per cent of normal, as compared with 29.4 per cent during the first week. The output of the 7 days, Nov. 9 to 15 (including lignite and coal coked), was 3,990,000 net tons. Compared with the week before, this was an increase of 438,000 tons, or 12.4 per cent. The average production during the four weeks ended Oct. 25, which may be regarded as normal, was 12,089,000 tons. Since the strike order was withdrawn on the afternoon of Tuesday, Nov. 11, the week contained two days during which the order was in force and four days after it had been withdrawn. Production was not resumed during the week on a considerable scale, except in scattering districts outside the Central Competitive Field.

Some Factors in the British Steel Situation

Large War-Time Additions to Capacity, But Outputs Are Not on the American Scale—High Fuel Cost a Handicap in International Competition in Steel

—BY A. I. FINDLEY—

THE year since the armistice has not met expectations in clearing up the situation as to international steel trade. To-day the confusion over the relative positions of Great Britain, France, Belgium and Germany as producers and sellers of iron and steel after the war is not much less than it was in November, 1918. The United States, playing more or less the role of an opportunist, has had even a greater foreign trade with the Orient, with South American and some other neutral countries than in war time, when all her energies were bent to production for her own war needs and those of her Allies. But the leading producers of steel in Europe, for reasons that have become quite familiar as the year has advanced, have been able to give little indication of what they can do under the new conditions.

I spent September and a part of October in England and France, meeting men in the iron and steel and metal-working machinery trades in both countries, and also having opportunity on shipboard going and coming and while abroad to talk with many Americans who wanted to find out the chances of doing business with Europe. The time at my disposal permitted of no thorough investigation of costs, or of iron and steel works practice or of comparative labor efficiency. Indeed, I doubt if a stay of months, under present conditions, could develop much of permanent value in those directions. The investigator, in the first place, would find few men in the trade in a mood to discuss these questions; in the next place few data are available, and everywhere was the feeling that industry was in transition and that labor conditions and governmental policies and international finance were too uncertain to permit manufacturers to do more than carry on from month to month.

Disappointment to Salesmen

Most American business men who have gone to Europe in the past six months have been disappointed. The majority had painted a picture of rebound from the war which was not matched by anything they saw over yonder. Salesmen found that credits were the crux of the situation and that until something came out of pending negotiations with the United States calling for financing on a large scale, there was little use in attempting to do business. It is not easy for a salesman, sent out to open the way for trade relations, to spend weeks or months in Europe, and not a little money, and then report that the best thing to do is not to do anything. But that has been the tenor of many reports of the past few months.

No doubt the hard conditions of travel and the experiences of American travelers in respect to food and domicile in European countries have colored their reports. But it is to be considered that they went abroad hoping to find ways of doing business. Some of them started from home with the belief that Mr. Vanderlip's view of the financial outlook in Europe was too pessimistic. What they saw and heard in their contacts with Europeans in their various lines of trade and manufacture differed in no material way from the tenor of Mr. Vanderlip's conclusions after his interviews with European bankers and finance ministers.

THE IRON AGE has given its readers in the past

year the most and the best obtainable news concerning developments in iron and steel in Great Britain, France, Belgium, Italy and Germany, and our London cables have been the American iron trade's dependence for prompt information on every important development. What I shall write in this and in two or three articles that are to follow will be some impressions gained in my recent visit and some suggestions as to what may be expected in the steel trade of the four Allied countries and Germany.

War Prosperity of British Steel Companies

British manufacturers of steel prospered during the war. In spite of all that is said of the large share of excess profits and of all income taken by government levies, the leading companies, just as was the case in the United States, made money beyond any dreams of pre-war times. The British companies, moreover, had an advantage over our own in that a large part of their expenditures for new construction in war time were made from earnings which the government exempted from the excess profits tax. The government sorely wanted increased production. The manufacturers pointed out that with costs of construction more than double those before the war the new investment would be on a scale that could only prove a serious handicap in years to come. Thereupon arrangements for exemptions were entered into. Some of these in the early period of the war were as high as 80 per cent of the cost of the additions. Later when the system of government bounties on steel came in, the exemptions on new construction were made considerably less. But the outstanding fact is that British steel manufacturers face the future with a very considerable endowment of modern plant paid for out of war earnings, that they distributed good dividends out of war earnings and that, in common with American steel companies, they enter upon the post-war period with large surpluses. But current earnings tell quite another story.

British Rolling Mill Practice

The additions made to British steel works during the war resemble American plants quite closely. The buildings are heavy, the cranes of large capacity. The mills frequently have steel housings and are driven by great reversing motors. American engineers who have been in Great Britain in the past half year have commented on the very general practice of using two-high reversing mills for blooming and for rolling plates and shapes. Three-high mills are just beginning to be introduced. Larger rolls are commonly used than in the United States, this being notably the case in blooming mills. Shape mills vary from 32 in. to 36 in. On a mill of the former size sections are rolled which in the United States would be finished on a 26 in. or 28 in. mill or perhaps smaller. It is common practice to build plate mills with two stands on one shoe, the second stand being used for finishing. Three new plate mills have been under construction in Great Britain in recent months. So great is the demand for ship plates that a number of mills have work ahead that will occupy them fully a year. Bolchow, Vaughan & Co. are building a new three-high plate mill at Middlesbrough, 100 in. wide, that will furnish about 15,000 tons a month.

It will replace a two-stand mill and will roll more than twice the tonnage with fewer men.

Moderation in Output

What surprises one familiar with the performance of American mills is the small outputs the British managers expect to get from their large-steel works and rolling mill installations of war time. Naturally as compared with 2000 tons per week as the standard output of a melting plant or rolling mill before the war, satisfaction is taken in the fact that the newer operations will get up to say, 5000 tons per week for a large blooming mill or an open hearth plant of 10 to 12 furnaces. But that is considerably under what an American management would count on getting from a similar outfit. Some of the heavy new reversing blooming mills at British works, for example, are designed to produce about 50 tons per hour. In the United States a similar mill would be expected to turn out 150 tons an hour and some of the newer mills in this country are laid out for considerably more.

Open Hearth Furnaces With Refining Mixers

Most of the additions to British steel making capacity have been open hearth furnaces. The acid Bessemer output fell off from 1,059,000 tons in 1917 to 788,000 tons in 1918, and the basic Bessemer, which for years has ranged from 500,000 to 600,000 tons a year, was 567,000 tons in 1918. As the loss in process and the cost of operation of the basic Bessemer are much larger than in the case of the newer basic open hearth plants, with their refining mixers, the former may be expected to decline further. The new open hearth furnaces have been built of 50 to 75 tons capacity and particularly noteworthy in connection with these additions is the building at most of the new plants in Scotland and the North of England district, of refining mixers in which the silicon is reduced. The mixers are of 400 to 500 tons capacity and are tilting, and are placed in conjunction with stationary open hearth finishing furnaces.

Small Pig Iron Outputs

The idea that a long life for the lining is one of the chief ends in blast furnace operation still shows great vitality in Great Britain. The American policy of "a short life and a merry life" for linings, but meantime large pig iron output, does not find acceptance. So there are still being built in Great Britain new furnaces intended to produce 1000 to 1500 tons of pig iron per week, even though in Germany, with much the same quality of ore, much larger outputs have become the rule. Nor has British coke oven practice changed from the use of low silica brick and from 24 to 32 hours coking time, as against 13 to 14 hours in the United States.

Whatever may be said of the inability of British works to reach American standards in tonnage, credit must not be withheld for the effort so commonly in evidence to insure quality of product.

The British Competitive Position

British iron and steel manufacturers are not given to public discussion of their business, but enough has been printed in the past six months to show that they are deeply concerned over their position both in the domestic and the export trades. They have never had so much to say about an American menace since the late George R. Dunell wrote his famous articles in the *London Times* and later his book on "American Engineering Competition," in 1900 and 1901. While they recognize that the high price of the American dollar for the present operates as a protective tariff, they do not conceal their fear that more permanent forces are at work which may seriously affect their position in international trade in iron and steel.

Just when Great Britain needs to increase her exports to the utmost, British-owned ocean liners are taking on coal at American ports sufficient for the trip to England and return. I went over on the *Baltic* and returned on her sister ship, the *Adriatic*, and both got their coal for the round trip at an American port. British coal is higher priced than American coal and British miners are not producing enough fuel to keep their own countrymen warm in the coming winter. British coal should be doing its part in putting sterling exchange on the way back to normal; but the British miner of coal is not willing.

High Fuel Cost a Serious Handicap

It is significant of the serious thought British steel works engineers are giving to their high coal costs that the Iron and Steel Institute at its meeting in September had as its main topic fuel economies in steel making. Readers of *THE IRON AGE* have before them in this issue a digest of two of the papers read on that occasion and the discussions these called out. The prodigal American use of fuel in iron and steel making have long been a proverb in Europe; but it is apparently not well appreciated on this side how far our steel works engineers have gone in the past ten years in putting a stop to their wastes. It was interesting to note in the Iron and Steel Institute discussion of fuel saving that the coal consumption per ton of finished steel, where blast furnace gas engines were used, where by-products were recovered in coking and where coke oven gas was used in open hearth furnaces and in soaking pits, was reckoned at 33 cwt. This was quite at variance with the estimate of four tons of coal per ton of finished steel which had been presented by steel makers at the public hearing on the British coal miners' demand for increased wages. That estimate roughly reckoned that the miners' demands, which were granted later, would mean 6s. increase in the price of coal, and that this in turn would mean an increase of more than £1 in the cost of making steel. This, it was argued, would be a further serious handicap in competition with steel from the United States. The discrepancy is largely accounted for by saying that the 33 cwt. of the Iron and Steel Institute discussion applied to heavy products, which are produced by rolling from the ingot without reheating, whereas a four-ton fuel consumption was represented by reheatings at various stages in the production of the lighter products such as sheets, tin plates and wire. As is well known, British practice in general has involved considerably more reheating than that of American or German mills.

War Expenditure Still Continues

One cannot be many days in London, meeting and talking with men of affairs and at the same time following the news and the newspaper comment on current developments in industry, without feeling the weight of the economic burdens under which the people are struggling. The British Government's floating debt is roundly \$6,000,000,000 and the Government is spending every day over \$8,000,000 more than it is taking in in taxes, enormous as these are. There is everywhere, just as there was in the war, a dogged faith that the country will pull through, yet no man will venture to say when the corner will be turned and the nation again set on the road to financial soundness. It is admitted that the out-of-work allowances cannot go on indefinitely at the present rate, that actual war work, of which more is still in progress than dare be told, must stop, and that there is no sign of a disposition on the part of British workers to produce more rather than less. Indeed, the things writers in the British newspapers are saying about the economic situation are more unfavorable than they would tolerate from an American onlooker. At the same time neither a British nor an American critic of conditions and tendencies in British

industry would say that the threatened catastrophe will not be averted.

Greater Export Outlet Must Be Found

Great Britain's increase in steel production in the war period, while not up to the promises made by the British Ministry of Munitions, was close to 30 per cent, as represented by 7,660,000 tons of ingots and castings in 1913 and 9,800,000 tons in 1917, which, as in the United States, was the year of largest output rather than 1918. The Ministry of Munitions had made plans for 3,000,000 tons increase in basic and 3,000,000 tons increase in acid steel, but there was no way of getting into the country the additional high-grade ores needed for acid steel, so that the expansion that actually took place was largely in basic steel and from domestic ores. The basic open hearth output showed a notable increase, indeed, in 1918, being 3,924,000 tons, against 3,421,000 tons in 1917, though for steel of all kinds the 1918 total was about 9,600,000 tons, or 200,000 tons less than in 1917.

With her increased capacity for steel making, Great Britain must now deal with the problem of finding a greater outlet for steel than was represented in her pre-war export trade. To begin with, she must now recover some trade she had before the war. One item here is the large share of the international tin plate trade the United States has supplied, to which is chiefly due the increase of American tin and terne plate production from 931,000 gross tons in 1914 to 1,474,000 tons in 1918.

The Tin Plate Situation

Frank W. Gilbertson, head of the well known firm of steel and tin plate manufacturers of Pontardawe, Swansea Valley, South Wales, who is vice-chairman of the Welsh Plate and Sheet Manufacturers' Association, said frankly that there is a long road to travel in the recovery of Great Britain's foreign trade in tin plate and galvanized sheets. "For the first seven months of this year," said Mr. Gilbertson, "our galvanized sheet exports from all parts of Great Britain amounted to 62,000 tons, compared with the normal pre-war total of a similar period of over 400,000 tons. For the same period our tin plate exports reached 150,000 tons, compared with the pre-war figure of 280,000 tons. Our galvanized sheet trade, which is almost entirely an export trade, has hardly begun to get going, while our tin plate trade, which has a large home market as well, is producing only 60 per cent of capacity."

Mr. Gilbertson added that lack of labor is preventing an increase in British tin plate production. While high wages are offered, the work is hard and hard work seems to be out of fashion. "The reduction of working hours, coupled with the casualties of the war and the migration of munition workers, has produced a gap that is difficult to fill, and the whole matter is complicated by the housing question, by the out-of-work donation, by the high minimum wage paid in collieries, and by many other factors."

The most serious feature in the situation, Mr. Gilbertson pointed out, is that the price of sheet bars in the United States in October was \$42, whereas the British price was £14 [now £15]. The price of a box of American tin plate was \$7, whereas the British price was 35s. to 36s., and meanwhile has steadily advanced until it now stands at 46s. to 47s. Mr. Gilbertson blames government interference largely for the serious situation confronting the tin plate industry—all British industry, in fact. The awards to the coal miners was the most serious blow of all. The Minimum Wage Act, the Colliers' War Wage and the Sankey award "enable a collier to earn perhaps 15s., perhaps 20s., a day in our local mines, practically without doing any work, while if he chooses to absent himself, he still receives as

pocket money a sum equal to the unskilled labor rates of many European countries. You will see that the results are inevitable. Vast numbers of men are having their manhood sapped and are restricting output or working 'on the minimum,' because government, wiser than Nature, has tampered with natural law, and has succeeded in breaking the connection that has always existed, and some day must again exist, between effort and reward. My only fear is that a very bad time is needed to restore sanity to us all, and it does not seem to be very far off."

Mr. Gilbertson's views are typical of expressions made by a number of important producers of iron and steel products.

Rapid Restoration in France

According to Eugène Schneider, in an address at a luncheon given by the Merchants' Association of New York on Friday, Nov. 21, to the foreign delegations to the International Trade Conference, held recently at Atlantic City, the greatest part of the railroads and canals which were destroyed in France is already restored. Almost one-half of the houses and buildings have been replaced and in a few months, or perhaps a year, he expects that production will be at the normal rate before the war. "France," he said, "is neither broken-down nor weakened."

Alexandre de Groote, vice-president of the Antwerp Chamber of Commerce, said that the harbor of Antwerp was left intact by the Germans and Antwerp was able immediately to resume trade. The imports are about 40 per cent of those of 1913, but the outward movement is still suffering very much. Before the war, 115 shipping lines used the port of Antwerp and there have already been 100 applications for a resumption of service. Although 3 miles of wharfage or dockage facilities were added in 1914, now there is a fear of shortage.

Shop Training Department

The Wilson Foundry & Machine Co., Pontiac, Mich., has opened a shop training department for the purpose of developing available labor to the highest possible point of efficiency.

This department will be under the direction of J. W. Rogers, who has had much experience in this line of work with the Erie and Pennsylvania railroads, and while serving as a training expert in the Department of Labor. Mr. Rogers also brings the benefit of two and a half years' study of shop training methods in England, France, Belgium, Austria and Germany.

The Wilson innovation is based on the theory that men and women may be quickly trained through intensive application for work in the basic trades and that these same men and women are eager to learn.

The operation of the shop training department rests on two propositions, as follows:

1. That a man or woman in the Wilson employ can learn any of the occupations in the Wilson Foundry & Machine Co. plant in a period of not more than three or four weeks, and some of the simpler operations in as short a time as 10 days.

2. That while he is being instructed in an occupation the worker should be paid at a fair rate, consistent with the living requirements of the day and locality of his employment.

Drain Steel Co.'s New Plant

The Drain Steel Co., Perry Building, Philadelphia, of which J. A. Drain, formerly of the Tindel-Morris Co., Philadelphia, is president, has begun the construction of a steel plant at Moore, Pa., near Philadelphia. The plant will consist of several open-hearth furnaces, a forge shop and probably a building for special steel manufacture. Further details will be announced by the company later.

The New by-products coke plant of the Wisconsin Steel Co., South Chicago, Ill., commenced operations on Nov. 15. The plant consists of two batteries of 44 ovens each. One battery is now producing and the other will be placed in operation about Jan. 1.

PERSONAL

L. E. Strothman, manager of the pumping engine and steam turbine departments of the Allis-Chalmers Mfg. Co., Milwaukee, has been nominated for a member of the Council of the American Society of Mechanical Engineers.

N. B. Folsom, for several years assistant treasurer Brier Hill Steel Co., Youngstown, Ohio, has been appointed treasurer, to succeed John Stambaugh.

William Thomas, general superintendent of the steel foundry of the Steelton plant of the Bethlehem Steel Co., has resigned to enter the service of the Vulcan Iron Works, Wilkes-Barre, Pa. Miles M. Fox, for 17 years with the Steelton plant, will succeed him.

The new organization of the Warren Iron & Steel Co., Warren, Ohio, is as follows: C. B. Loveless, president and general manager; Dan A. Geiger, vice-president; L. L. Jones, secretary and treasurer.

William B. Curtis, formerly engaged in the sale of conduit for the Youngstown Sheet & Tube Co., Youngstown, Ohio, has resigned, and is now president and treasurer of the Steelduct Co., recently organized, and which has offices in the Dollar Bank Building, Youngstown.

George R. Wetten and Arvid E. Nissen have joined the Hess Steel Corporation, Baltimore, Md. Mr. Wetten was roll designer for the Cyclops Steel Co., Titusville, Pa., and formerly with the Atlas Crucible Steel Co., Dunkirk, N. Y., and the Carbon Steel Co., Pittsburgh. While with the Cyclops company he designed the new 12-inch mill for rolling carbon and high speed tool steels, and on completion of this work came East to do similar work for the Hess Steel Corporation. Mr. Nissen, assistant superintendent of the melting shop, was formerly with the Taylor-Wharton Iron & Steel Co., Highbridge, N. J., as assistant metallurgist, and previous to that in the open hearth department of the Illinois Steel Co. at Gary, Ill.

Perry Dowell has resigned as purchasing agent and factory manager of the Kaufman Metal Parts Co., Bellefontaine, Ohio, to take charge of the New Orleans office of the Ingalls Iron Works Co., Birmingham, Ala.

W. E. Woodruff, formerly with the R. K. LeBlond Machine Tool Co., has been appointed superintendent of the Stuebing Truck Co., Cincinnati.

Eugene Schneider, noted French iron and steel manufacturer, now touring the United States with a party of 80 delegates to the International Trade Conference, being at the head of the French mission, was given the degree of Doctor of Science by the Western Reserve University, Cleveland, when the delegates visited that city, Nov. 14. During the exercises brief speeches were made by Mr. Schneider, Samuel Mather and others. Mr. Schneider also spoke at a noonday luncheon given for the visitors by the Cleveland Chamber of Commerce.

J. G. Hallas has resigned as purchasing agent of the Duquesne Steel Foundry Co., Pittsburgh, and has been succeeded by M. P. Emmerich.

Michael J. Toomey, foreman of the open hearth department of the Steelton plant of the Bethlehem Steel Co., with which he had been connected 24 years, has resigned his position to become superintendent of the open hearth department of the American Tube & Stamping Co., Bridgeport, Conn. The resignation becomes effective Dec. 1.

C. F. Neudorfer has been promoted from general superintendent to general manager of the Standard Tank Car Co., Sharon, Pa. N. L. Mabey, chief engineer for the past two years, becomes assistant general manager. J. T. O'Connor, formerly superintendent of transportation, has been named purchasing agent and will be succeeded in his old position by J. R. Sweeney. Frederick Burroughs, chief estimator, has been appointed chief engineer, while J. W. Todd, assistant chief engineer, has been named assistant purchasing agent.

T. H. Symington has resigned as president of the T. H. Symington Co., 30 Church Street, New York, manufacturer of railroad specialties, to become chairman of the board of directors. He will be succeeded as president by Charles T. Symington.

F. N. Speller, metallurgical engineer National Tube Co., Pittsburgh, is author of technical paper 236 of the Bureau of Mines, Department of the Interior, entitled "Abatement of Corrosion in Central Heating Systems."

Russell W. Stovel, who recently returned from France, where, as lieutenant-colonel of engineers, he served as chief of the Terminal Facilities Division of the Army Transport Service, has been appointed a consulting engineer of Westinghouse, Church, Kerr & Co., Inc., New York, to attend the company's electrical and mechanical work. He was graduated from McGill University in 1897 with the degree of Electrical Engineer, and the following year entered the employ of Westinghouse, Church, Kerr & Co. He soon became an assistant engineer, then successively engineer-in-charge and mechanical engineer of the company, and finally a managing engineer. He has designed and constructed many large power plants, piers and machine shops. In 1914 Mr. Stovel became managing engineer for Gibbs & Hill, consulting engineers, New York. He is a member of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers.

Fred P. McLyar, for eight years hot mill foreman at the Guernsey works of the American Sheet & Tin Plate Co., Cambridge, Ohio, has been appointed superintendent of the new plant of the Newton Steel Co., Newton Falls, Ohio.

H. Z. Kelly, for six years with the Falcon Bronze Co., Youngstown, Ohio, has been appointed district representative at Youngstown for the Keystone Bronze Co., Pittsburgh. He was secretary and assistant manager of the Falcon Bronze Co. at the time of his resignation.

Gen. George W. Goethals announces that George W. Mixer has been elected vice-president and a director of George W. Goethals & Co., Inc., consulting engineers, 40 Wall Street, New York.

William L. Moorhead has resigned as vice-president of the Duquesne Electric & Mfg. Co., to associate with Henry T. Parsons, machinery, under the name of Parsons-Moorhead Machinery Co., with offices in the Hostetter Building, 237 Fourth Avenue, Pittsburgh.

Arlington Bensel, vice-president Driver-Harris Co., Harrison, N. J., resistance wire and alloys, left Nov. 18 for Europe to visit the plant of Driver, Drennen & Cooper, Manchester, England, as well as the Continent to look over the general export situation. He will be absent two months.

Fred W. Huebler, formerly with the Uniflow Boiler Co., Philadelphia, has been appointed district sales manager for the Bigelow Co., New Haven, Conn., manufacturer of fire tube and water tube steam boilers. Mr. Huebler will have charge of the Philadelphia, Pittsburgh and Chicago districts.

Comly B. Shoemaker, Jr., has been appointed assistant superintendent of the Roe puddling department of the Reading Iron Co., Reading, Pa.

Carl J. Schumann, secretary Hilo Varnish Corporation, Brooklyn, N. Y., was elected president of the National Varnish Manufacturers' Association at the annual meeting in Chicago on Oct. 28.

George B. Malone has resigned as works manager of the Monel Metal Products Corporation, Bayonne, N. J., to become general manager of the K-G Welding & Cutting Co., 556 West Thirty-fourth Street, New York.

Paul M. Lincoln, for many years commercial engineer of the Westinghouse Co., Pittsburgh, has resigned from that organization, effective Nov. 1, to enter the consulting engineering field, and have active charge of motor application for the Lincoln Electric Co., Cleveland. The work which Mr. Lincoln will take up with the Lincoln Electric Co. involves the entire problem of motor drive for machinery, the determination

of the proper type, characteristics and size of motors best adapted for direct connection to various sizes and types of machinery.

H. K. Pollard, sales manager Bayonne Steel Casting Co., Bayonne, N. J., has resigned, effective Dec. 1, to become sales manager of the Deemer Steel Casting Co., Newcastle, Del.

Capt. James E. Bailey, until recently construction officer at the Charlestown (Boston) Navy Yard, has resigned to become associated with the Baltimore Drydock & Shipbuilding Co.

I. C. Scovill resigned as sales manager for the Collis Co., Clinton, Iowa, on Nov. 1, and has accepted the position of sales manager for the Detroit Reamer & Tool Co., Detroit, Mich.

Carl Edward Johansson, inventor of the Johansson gages, gave an illustrated lecture on precision measurement at the Machinery Club of Chicago on Nov. 22.

G. W. Norris, formerly in the accounting department of the Youngstown Sheet & Tube Co., has resigned and is now in the Cleveland office of the Liberty Steel Products Co.

W. C. Briggs, formerly New York district manager for the Shepard Electric Crane & Hoist Co., 30 Church Street, New York, has accepted a connection with the Pennsylvania Crusher Co., Philadelphia. He is succeeded in the New York office of the Shepard Company by R. W. Hurst.

Lieut. Edward J. Cross has been elected president and general manager of the Commercial Lubricants Co., 1846 Belmont Avenue, Chicago, cutting lubricants. Before serving in the army, Lieutenant Cross was associated with the International Lubricants Co., Chicago.

William H. Haward, formerly in the sales department of the Youngstown Sheet & Tube Co., is now with the Youngstown Boiler & Tank Co., Youngstown, Ohio.

Frederick A. Hardin has been appointed southern representative for the Victor Saw Works, Springfield, Mass. Mr. Hardin was previously with Oliver H. Van Horn, New Orleans, and succeeds E. C. Paddock, who has been transferred to the Middle West.

L. Vergniaud, president Société Anonyme des Etablissements Jacob Holtzer, of Unieux, France, and chief engineer Balazuc, who have been visiting a number of tool steel plants in this country, one of the specialties of the Holtzer works, have returned to France.

George M. Brill, formerly consulting engineer in Chicago, and in the period of the war identified with the United States Shipping Board Emergency Fleet Corporation, has established himself in consulting engineering in New York. He will devote himself to the engineering of industrial plants and processes and investigations for improvements in operation and for financial purposes. He has secured temporary quarters at 2607 Singer Building, but after May 1 will be in the Guaranty Trust Building at Fifth Avenue and Forty-fourth Street, New York.

O. P. WILSON, for several years assistant general manager of the Norma Co. of America, ball and roller bearings, at a recent meeting of the board of directors was elected vice-president and treasurer. W. M. Jones continued as president and treasurer.

ALBERT M. ERNST, formerly New York purchasing agent of the United Fruit Co., is now in charge of the purchasing department of Topping Brothers, New York, railroad and contractors' supplies and marine hardware.

HARRY T. CALKINS has joined the sales force of the New York office of the Tacony Steel Co., Philadelphia, and will handle the Connecticut territory exclusively.

C. A. PENNOCK has been appointed general superintendent of the Eastern Rolling Mill Co., Baltimore. Mr. Pennock was formerly superintendent of the Massillon Rolling Mill Co., Massillon, Ohio and became superintendent of the sheet and tinplate plant of the Bethlehem Steel Co. at Sparrows Point, Md. when it was built.

RUSSELL E. CRANK, formerly with the Bethlehem Steel Co. and inspector of naval ordnance, has opened up offices in the Stephen Girard Building, Philadelphia, and is dealing in steel bar stock.

T. ARCHIE THORN, formerly of Harrington-Robinson Co., Boston, is now associated with the Aborn Steel Co., 171 High Street, Boston. The Aborn Steel Co. is increasing its stock of high grade tool steel, alloy steel and other steel bars in the Boston warehouse.

W. F. FIGEE, formerly in the export machine tool trade in New York, and Harry S. Haynes, formerly with the Patterson Tool & Supply Co., New Orleans, La., are both now connected with the sales department in machine tools of Manning, Maxwell & Moore, Park Building, Pittsburgh.

H. C. TORRANCE, Pittsburgh manager Brown Hoisting Machinery Co., Cleveland, has just returned from a four months' trip to Europe, where he went to study the probable machinery needs of the countries devastated by the war.

B. H. REDDY has resigned as chief engineer of the National Roll & Foundry Co., Avonmore, Pa., to become associated with the Southern California Iron & Steel Co., Los Angeles. Mr. Reddy formerly was chief engineer of the National Pressed Steel Co., and designed and constructed the plant of that company at Massillon, Ohio.

JAMES S. HEARONS has become affiliated with the Gustin-Bacon Mfg. Co., Kansas City, Mo., air strainers, as railroad representative. Since his return from France in July, where he held commission as captain in the 49th Engineers (Ry.), Mr. Hearons has been with the Garlock Packing Co. at St. Louis, with whom he was connected prior to his entering the service.

CAPT. ELLIOT SNOW, New York Shipbuilding Co., Camden, N. J., superintendent of construction, has been assigned to the Charlestown, Mass. Navy Yard as head of construction department.

FRANK McLAUGHLIN, general manager of the Mobile Shipbuilding Co., Mobile, Ala., has resigned, and the duties of that office are being discharged by H. L. Brittain, president.

E. H. CORNELL has been appointed manager of the Chicago branch of the Graton & Knight Mfg. Co., belt manufacturer, with headquarters at 34 South Jefferson Street.

F. G. BALDWIN, First National Bank Building, Cincinnati, has been appointed sales representative for Southwestern Ohio, for the Stark Rolling Mill Co., Canton, Ohio.

J. D. JONES, for several years chief engineer at the Gary plant of the Indiana Steel Co., has become general superintendent of the Algoma Steel Corporation, Ltd., Sault Ste. Marie, Can., succeeding J. M. Nelson, recently resigned.

OBITUARY

HENRY L. GANTT, for years one of the leading exponents of scientific management, died unexpectedly at his home in Montclair, N. J., Nov. 23, after being ill eight days. Early in his career, after graduation from Stevens Institute of Technology, he was engaged in the works of the Bethlehem Steel Co., where he came in contact with the late Frederick W. Taylor and espoused scientific management as it was developed by Mr. Taylor. While employed at the Bethlehem plant, he developed the 8-in. armor-piercing projectile. Subsequently he was employed by the American Locomotive Co., and at that time contributed a series of papers before engineering societies on management matters, notably to the American Society of Mechanical Engineers, which he has served both as one of the board of managers and as vice-president. For some years he has been engaged in practice in New York as a consulting engineer, devoting himself to the application of scientific management in a number of notable manufacturing establishments. He has been a frequent contributor to the technical press and is the author of a number of books, the best known probably being "Work, Wages and Profit." Mr. Gantt was in his 58th year.

CHARLES BURGESS, aged 78, for many years well known in the tool steel trade, died recently at his home in Oil City, Pa. He was born in England in October, 1841, and when a young man became interested in the iron and steel business. He came to this country in 1866, locating in Pittsburgh, forming a company for the purpose of manufacturing steel, under the firm name of Burgess, Aston & Co. The plant was operated by Mr. Burgess until 1870, when he went to Portsmouth, Ohio, where he started the Burgess Steel & Iron Works. In 1884, he went to Titusville and organized the Cyclops Steel Works, which he operated 32 years, until March 1, 1916, when he sold it to Carl F. Boker & Sons. Mr. Burgess was the inventor of a secret process for making high-grade tool steel.

DANIEL ASHWORTH, age 78 years, died at his home in Crafton, Pa., on Nov. 8. Early in life he was identified with the glass industry, and in 1882 he was superintendent of steam engine construction for the Lane & Bodley Co., Cincinnati, but starting with 1884 he did mechanical engineering work for the Carnegie Steel Co. He was one of the organizers of the American Society of Mechanical Engineers, was a life member of that body, also a member of the National Association of Steam Engineers and a member of the Engineers' Society of Western Pennsylvania. He served in the army and navy during the rebellion, and for some years was pension agent at Pittsburgh.

A. L. PATCH, president, S. B. Patch & Sons Co., machinists and founders, Streator, Ill., died in that city on Nov. 6.

EDWIN R. STOUTON, resident agent of M. A. Hanna & Co. in Detroit for years, and a well-known metallurgical engineer, died recently at Atlantic City. He had been ill for many months. Mr. Stouton was a director of the Detroit Twist Drill Co. He was about 55 years old.

J. J. FISHER, a prominent oil operator of Pittsburgh and director of the Parkersburg Iron & Steel Co., Parkersburg, West Va., died at his home in Pittsburgh on Nov. 12.

LACY S. MCKEEVER, aged 58, for some years treasurer of the Pittsburgh Testing Laboratory, died at his home at East End, Pittsburgh, on Monday, Nov. 17.

CHARLES E. ALCORN, day superintendent of the plant of the Weirton Steel Co., Weirton, West Va., died recently, as the result of an operation.

GEORGE J. CAPEWELL, 76, founder of the Capewell Horseshoe Nail Co., died at his home in Hartford, Conn. He invented machines which made profitable the finishing of horseshoe nails by power processes. He established his business in 1876.

At the sheet mill of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, extensions are being made comprising six new sheet mills, four of which are being installed at the present time. The entire furnace installation in this extension will be powdered-coal fired. For this work the air transport system for distributing the powdered coal, together with apparatus for controlling and burning will be supplied and installed by the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York.

The Hammond Steel Co., Inc., Syracuse, N. Y., has completed extensive additions to its plant at Solvay, N. Y. The extensions include 16-in. and 10-in. rolling mills, straightening machinery, turning equipment, new electric furnaces and annealing plants. With the completion of the work now under way, the company will start the erection of a plant for cold drawing. The company will devote its efforts to the production of high grade hammered and rolled tool and alloy steels, die blocks and special forgings.

In printing the announcement of recent changes among officials of United Engineering & Foundry Co. of Pittsburgh, it was stated that K. C. Gardner, former manager of sales of the rolls department, had been elected to succeed F. C. Biggert, Jr., as second vice-president. The name should have read William Gardner, who still maintains his position as manager of sales of the rolls department, and who is also second vice president of the company.

FUEL SITUATION AT CHICAGO

Mills Using Oil To Conserve Coal—Some Rolling Mill Resumptions

CHICAGO, Nov. 25.—Following the official revocation of the coal strike two weeks ago, the Railroad Administration, acting for the Fuel Administration, released much of the coal which had been held in transit, thereby temporarily satisfying the needs of many industries. Under the original regulations governing coal distribution, issued on Nov. 1, consumers were required to make formal application for the fuel they desired and these requests were given consideration in accordance with the following priority list:

1. Railroads
2. Army and Navy and other departments of Government
3. State and county departments and institutions
4. Public utilities
5. Retail dealers
6. Manufacturing plants on War Industries Board's preference list
7. Other manufacturing plants
8. Jobbers
9. Lake
10. Tidewater

On Nov. 6, all restrictions were removed on the movement of coal to the first four classes in the list. On Nov. 14, however, when it became apparent that the miners were not returning to work, the exception made in the case of those four classes was revoked with the result that all consumers must now make application for coal as before. Should the present conference between the miners and operators end in a deadlock, Railroad Administration officials state that passenger transportation will be cut to the bone; freight movement will be confined to livestock, food and coal; available undelivered fuel stocks will be reserved for the use of the carriers, the Federal and State Governments, public utilities and domestic consumers; and industries without accumulated reserves will be forced to suspend operation.

Purchases Chattanooga Corporation Properties

CHATTANOOGA, TENN., Oct. 28.—The Iron Products Corporation, which has recently acquired Essex Foundry and Central Foundry, has purchased the properties of the Chattanooga Iron & Coal Corporation, consisting of one modern skip-fed blast furnace and 20,000 acres of developed coal and ore lands tributary thereto. The Iron Products Corporation likewise owns and operates Tuscaloosa furnace at Holt, Ala., with coal mines, Semet-Solvay by-product ovens and ore mines. The nine foundries of the company, located at strategic points north and south, are thus amply protected for metal. The combined annual output of the furnaces is in the neighborhood of 200,000 tons. Any surplus metal will be offered to the trade under the brands of "Tuscaloosa" and "Signal".

Handbook on Steel Lumber

The first edition of a book on steel lumber is being distributed by the National Pressed Steel Co., Massillon, Ohio. The book contains 72 pages, 4 x 6½ in., has a cloth cover, and is intended as a handbook for architects and engineers. The book lists and illustrates the company's line of standard pressed steel shapes designed primarily to take the place of wood joists and studs in floor and partition construction. The use of metal lath which is attached to the steel sections by prongs punched from the flanges provides a construction which eliminates combustible material. Numerous tables, graphs, loading formula, etc., add to the value of the publication.

Brass Association Meeting

The National Association of Brass Manufacturers will hold its annual meeting at the Hotel Astor, Thursday and Friday, Dec. 4 and 5. The work of elimination and reconstruction on the official catalog will be started. The convention will be addressed by speakers from the United States Chamber of Commerce and by William J. Wooley, general manager National Trade Inspection Bureau. The matter of standardization will also be started. William M. Webster, 139 North Clark Street, Chicago, is commissioner of the association.

Machinery Markets and News of the Works

New York

NEW YORK, Nov. 25.

Among new inquiries of the past week, one comes from the Liberty Starters Co., Poughkeepsie, N. Y., for nearly 100 machines, as follows:

- 14 Warner & Swasey No. 4 turret lathes.
- 18 plain and hand milling machines.
- Three double-spindle Jones & Lamson turret lathes.
- Four Atkins power saws.
- Eight two-spindle drilling machines.
- One No. 75 Heald internal grinding machine.
- Two 24 in. Jones & Lamson turret lathes.
- Seven plain grinding machines.
- One 3 x 36 in. Jones & Lamson turret lathe.
- Eight Fellows gear shapers.
- Three No. 6 Warner & Swasey turret lathes.
- Three 20 in. drill presses.
- Seven three-spindle sensitive drills.
- One four-spindle sensitive drill.
- One Warner & Swasey hand screw machine.
- Four single spindle sensitive drills.
- Four keyway cutters.
- One disk grinding machine.
- Four radial drills.
- One Eastern bench tapping machine.
- One Porter-Cable lathe.

The Empire Cream Separator Co., Bloomfield, N. J., is about to purchase considerable new equipment for the expansion of its facilities for manufacturing milking machines. A list is expected by the machine-tool trade shortly. The Crane Co., Bridgeport, Conn., has inquired for several tools, and there are numerous inquiries for one, two or three machines. The General Electric Co., Schenectady, N. Y., has issued inquiries for several more tools.

The American Car & Foundry Co., New York, has placed orders for plate-working machines and other equipment for its car-building plants. The Standard Oil Co. of New Jersey is expected to place orders this week for plate-working machines for shipment to Rumania. The Magor Car Corporation, Passaic, N. J., will take action probably within a week or 10 days on its recent list of about 50 machines. The company plans to increase its facilities for car repairs. The New Departure Mfg. Co., Bristol, Conn., will place large orders very soon.

The Whitlock Coil Pipe Co., Hartford, Conn., is about to occupy an addition with 30,000 sq. ft. of floor space, much of which will be utilized for the manufacture of oil-burning equipment. Later on some additional equipment, such as pipe bending machines, lathes, radial drills, etc., will be required.

The Defiance Machine Works, Defiance, Ohio, has appointed Manning, Maxwell & Moore, Inc., its New York representative for metal-working machines. The company will maintain its New York office for the sale of wood-working machines at 50 Church Street.

Domestic crane business is fairly good and numerous export inquiries are in the market from the Orient, but buying is light. There is an inquiry through an exporter, for six 5-ton cranes for France, but crane manufacturers are doubtful of being able to close it as Europe is evidently buying in German markets. On one recent inquiry an American bid was \$12,000 and a French company bid \$0,000 fr. Under a normal rate of exchange the American company would have been low, but with approximately 9.70 francs to the dollar, the American bid was considerably high. The advantage of early delivery lay with the American company, however, and the order has not yet been placed. Chinese inquiries are chiefly for hand power cranes and one company has made several small sales to China. Several inquiries are in the market from South America, both for hand power and larger cranes.

The United Verde Copper Co., Clarksdale, Ariz., has purchased several cranes from the Pawling & Harnischfeger Co. The International Motors Co., New Brunswick, N. J., has purchased a 5-ton magnetic crane, 46 ft. span and 168 ft. runway, from the Champion Engineering Co. James Stewart & Co., New York, contractors, have closed a contract with the Standard Oil Co. of Toledo, which involves a 10-ton crane. The Shepard Electric Crane & Hoist Co. has an order from the American Brass Co. for four overhead traveling cranes. The Chesapeake Iron Works has orders from the Bartlett Hayward Co., Baltimore, for two 15-ton cranes, with 5-ton auxiliaries, 61 ft. span, and the General Pipe & Foundry Co., Atlanta, Ga., for a 5-ton crane. The Follansbee Bros. Co., Pittsburgh, which is building a new sheet mill at Toronto, Ohio, and was mentioned in THE IRON AGE, Nov. 26, as being in the market for about 25 cranes ranging from five to 50 tons, has purchased cranes totaling several hundred thousand dollars from the Morgan Engineering Co. and Pawling & Harnischfeger Co.; the heavy cranes going to the former and the light ones to the latter company. The Drain Steel Co., Perry Building, Philadelphia, has purchased four Morgan cranes, including one 100-ton ladle crane, for a new open hearth steel plant at Moore, Pa., near Philadelphia.

The H. J. Koehler Motors Corporation, 154 Ogden Street, Newark, N. J., has acquired about 10 acres at the foot of Llewellyn Avenue, Bloomfield, N. J., and will erect a plant on the unit plan, with first building to be one-story, 100 x 260 ft. It will have a capacity of six motor trucks a week and will cost about \$80,000. It is expected to be ready for occupancy early in February, when its Newark works will be removed to this location.

A power plant, 71 x 80 ft., to cost about \$35,000, will be erected by P. Ballantine & Sons, Newark, N. J., at their bottling plant on Oxford Street. Four 500-hp. boilers will

be installed. M. N. Shoemaker, 207 Market Street, is the architect.

The Springfield Reamer & Tool Corporation, Springfield, N. J., has been incorporated with a capital of \$25,000 by Courtney E. Peer, Charles Brown and Harry L. Mulsnug.

The Newark Leather Machinery Co., 127 New Jersey Railroad Avenue, Newark, N. J., has acquired property, 40 x 112 ft., at Frelinghuysen Avenue and Stanton Street, as site for a new plant. Plans are being prepared for a one-story building to cover the entire plot, and estimated to cost \$35,000. It will give employment to about 150 persons. H. C. Metzler is president.

P. R. Mallory & Co., Port Chester, N. Y., manufacturers of tungsten products, have awarded a contract to George Mertz & Sons, Port Chester, for a two-story and basement addition, 40 x 112 ft., to cost \$60,000.

American Galco, Inc., New York, has been incorporated with a capital stock of \$100,000 by J. Hellstrom, H. Carlson and G. H. Kline, 8 West Fortieth Street, to manufacture machinery and tools.

The Davidson Pipe & Iron Corporation, 436 Kent Avenue, Brooklyn, has increased its capital stock from \$10,000 to \$50,000.

The American-La France Fire Engine Co., Elmira, N. Y., manufacturer of motor-driven fire equipment, has acquired 20 acres adjoining its plant and will use a portion of the site for an addition to be used for the manufacture of motor-trucks, to be developed as a new branch of the business.

The United Metal Spinning Co., 103 Mott Street, New York, is having plans prepared for a five-story building, 60 x 100 ft., at 440-46 Adelphi Street, Brooklyn.

The Crescent Washing Machine Co., New Rochelle, N. Y., has been incorporated with a capital of \$500,000 by H. E. and T. F. Merseles, and F. L. Holt, 165 Broadway, New York.

C. Hvass & Co., 509 East Eighteenth Street, New York, manufacturers of machinery, have leased property at 512-518 East Nineteenth Street, from the Standard Gas Light Co., and will build a one-story machine shop, 98 x 100 ft., to cost about \$15,000. Charles B. Hvass is president.

The West Brighton Brass Foundry, Inc., Richmond, Staten Island, N. Y., has been incorporated with a capital of \$10,000 by P. J. Knoblock, M. H. and M. Epstein, 721 Fulton Street.

Henry Hessner & Sons, 33 Bartlett Street, Brooklyn, manufacturer of wagons, etc., are having plans prepared for a one-story plant, 150 x 300 ft., at McKibbin and White streets, to cost \$60,000, including equipment.

The Paragon Bale-Tie Machine Corporation, New York, has been incorporated with a capital of \$200,000 by C. C. W. Brede and E. J. E. Vollvehr, 111 West Forty-second Street.

The Conductive Copper Co., New Brighton, Staten Island, N. Y., has been incorporated with a capital of \$1,000,000 by William L. Sweet, Jr., and Thomas Garrett, Jr., New Brighton; and Albert R. Bray, Passaic, N. J., to manufacture copper products.

Buffalo

BUFFALO, Nov. 24.

The Simmons Co., metal bed manufacturer, Kenosha, Wis., Buffalo office 17, Ellicott Street, will erect a branch factory, 81 x 256 ft., two stories, of brick, steel and concrete, at Rapin and Walden avenues and the Erie Railroad. The Kenwood Bridge Co., 39 South Dearborn Street, Chicago, has the contract.

The McCordy Tool & Die Co., Fulton, N. Y., has awarded contract for a two-story factory addition on Third Street, to cost \$10,000.

The Chautauqua Electric Car Mfg. Co., Elliott, N. Y., has been incorporated with a capital stock of \$750,000 by E. A. Peterson, A. N. Broadhead and E. C. Nord.

The Multipost Co., 69 Allen Street, Rochester, has let contract for a two-story factory building, 30 x 58 ft., at Center Park and Oak Street, to cost \$15,000. Wm. F. Schweiger is general manager.

Plans have been completed by the Atlantic Stamping Co., Rochester, for a factory addition, 69 x 201 ft., two stories, to cost \$75,000.

The Roberts Tool & Supply Co., Syracuse, has been incorporated with a capital stock of \$60,000 by F. A. and J. F. Roberts and F. J. Lynch.

Incorporation papers have been filed by the Linn Tractor Corporation, Morris, N. Y., by H. H. Linn, G. Whitman and R. R. Ripley. The capital stock is \$50,000.

The American Radiator Co., Buffalo, has drawn plans for a foundry addition, 50 x 190 ft., to its Pierce plant, Elmwood Avenue and the New York Central Railroad Belt Line.

The Bagg Steel Wheel Corporation, Buffalo, N. Y., has been incorporated by C. M. Bagg, 85 Woodbridge Avenue, F. C. Schoenthal and T. F. Hogan, with a capital stock of \$200,000.

The Fulton County Machine & Supply Co., Gloversville, N. Y., has been incorporated with a capitalization of \$150,000 by E. H. Van Valkenburgh, W. H. Decker and H. A. Steele.

A recent incorporation is the Syracuse Alloy Steel Co., Syracuse, N. Y., capitalized at \$190,000 by F. W. Herrick, C. A. Lawton and M. O. Warwick.

The Johnson Rim & Parts Co., Buffalo, manufacturer of automobile parts, etc., has increased its capital stock from \$50,000 to \$250,000.

The Kellogg Mfg. Co., 3 Circle Street, Rochester, N. Y., manufacturer of air pumps, is having plans prepared for a one-story machine shop, 200 x 800 ft., on Humboldt Street, to cost about \$200,000, including equipment.

Arrangements have been made for the sale of the plant at Vulcan Street, Buffalo, of the Fore River Shipbuilding Co., with main works at Quincy, Mass. The plant comprises about 12 acres of land, with machine shop, boiler plant, service and works buildings, etc., and cost about \$1,500,000.

The Buffalo Pressed Steel Co., 800 Kensington Avenue, Buffalo, has increased its capital stock from \$500,000 to \$1,000,000.

The International Time Recording Co., Endicott City, N. Y., is considering the erection of a reinforced-concrete plant addition on North Main Street, to cost \$150,000.

New England

Boston, Nov. 24.

In the past week a further large business in machine tools was done by local interests and every indication points to continued demand for the remainder of the year at least. The one big question is delivery. Most of the machine-tool builders have so many orders on their books that in accepting business they cannot guarantee deliveries for several weeks. Prices are growing steadily firmer. Upright drills have been unusually active the past week, but the bulk of the buying has come from Windsor, Clairmont and Springfield, Vt.

Second-hand machinery has had another period of activity since last reports and some fancy prices have been paid for special machines. New York dealers have again figured prominently in recent sales, the demand from this source apparently being inexhaustible.

Manufacturers of paper mill machinery and equipment are having an unprecedented business. Paper mills are increasing their manufacturing facilities as rapidly as possible and new works are being established.

The Textile Finishing Machine Co., Providence, R. I., is in the market for a large planer to be made to order. The Westinghouse Electric Co., Pittsfield, Mass., is buying odd machines for its East Springfield plant. A few Porter-Cable lathes have been bought by the Universal Winding Co., for its Providence, R. I., plant. The Bemis Car Truck Co., Springfield, Mass., has bought several lathes and a bolt cutter. H. H. Mayhew, Shelborn Falls, is in the market for an open sice planer. The Hobbs Mfg. Co., Worcester, Mass., has been buying a small amount of equipment. The Gillespie Mfg. Co., Lowell, Mass., manufacturer of washing machines, is buying equipment and expects to have its plant in full operation within a few months. The Boston & Maine Railroad is in the market for three small boring mills. The General Electric Co., Lynn, Mass., continues in the market for odd tools, most of them of special design. The Woburn Machine Co., Woburn, Mass., has bought two turret machines and is understood to be in the market for additional equipment. Scott & Williams, Laconia, N. H., manufacturers of knitting machines, expect to be in their new factory about Feb. 1 and sufficient orders have been booked to operate at capacity until June. The management is preparing a list of tools for the new plant. The Davis Machine Co., Burlington, Vt., has bought a plant in which it proposes to make chocolate-refining machinery. It is understood it plans to spend about \$200,000 for equipment. The 1920 budget of the Dean Works, Worthington Pump & Machinery Corporation, contains a list of only eight planers worth about \$50,000. Other requirements will be issued later. The Blake Works require seven planers, 30 to 72-in. It is understood the C. A. Williams Co., Laconia, N. H., will be in the market for machines. It makes latch-needles and manufactures its own machinery. The New England Oil Co., New Bedford, Mass., is reported in the market for pumps and tanks. It is understood it will require some machine-tool equipment.

The Standard Screw Co., Hartford, Ct., has moved its machinery from the factory of the Worcester Machine Screw Co. division, Worcester, Mass., and has distributed it to other plants with the purpose of centralizing the manufacture of screws and screw machine products. The Worcester factory will be devoted to machine shop purposes.

The Norton Co., Worcester, Mass., will establish a branch factory at Hamilton, Ont., to take care of its Canadian and British business. It will be conducted by the Norton Co. of Canada, Ltd., with capital stock of \$500,000, and an application for a Dominion charter will be made immediately. Land has been purchased and a factory will be built in the near future.

The business and property of the O. S. Walker Co., Worcester, Mass., manufacturer of grinding machines and magnetic chucks, has been sold by the owner, Oakley S. Walker, to a group of men prominent in the machine tool and supply business. The reorganization has been completed and the new management has assumed control. The name of the company will remain unchanged. The sale includes the plant at Greendale, the property comprising sufficient land to permit of future extensions. The officers are: President, W. B. McSkimmon, Boston; vice-president, J. H. Drury, Athol; general manager, secretary and treasurer, Clayton O. Smith, Worcester. The directors include the officers and William F. McCarthy, Boston. Mr. Smith until recently was sales manager of the Norton Grinding Co. Isaac F. Williams, who has been with the company for many years, will remain with the business. The new ownership brings with it increased capital for further development of the industry.

The business of the J. V. Critchely Mfg. Co., Worcester, Mass., the Park Mfg. Co., Springfield, Mass., and a Boston concern, the name of which is not given out, will be consolidated under the name of the Park Mfg. Co. A one-story factory, 90 x 113 ft., will be built in Worcester to house the combined operations. The companies manufacture automobile parts. J. Werner Critchely will be president and Thomas Crabtree treasurer.

The United Illuminating Co., Bridgeport, Conn., has bought eight acres in Pembroke Street from the Farist Steel Corporation, on which it proposes to build a power plant. Automatic stokers and ash handling equipment will be required.

The Worcester Machine Screw Co., Worcester, Mass., has dismantled its local plant and is shipping the machinery to its Hartford works. Recent labor troubles are the cause

for discontinuing the Worcester plant, a part of which will be used to carry a stock of parts. The company manufactures screws and specialties.

The Dane Machine Co., Inc., Salem, has been chartered with a capital stock of \$50,000 to do a general foundry and machine shop business. Joseph H. Poor, 38 Locust Street, Danvers, is president.

The Holmes Motors, Inc., Boston, with a capital stock of \$30,000, has been incorporated to manufacture engines, motors and machinery. Merchant E. Philbrick, 963 Commonwealth Avenue, is president.

The Smith-Springfield Body Co., Springfield, Mass., has filed application for a permit to build a plant in West Springfield at a cost of \$42,000. It will include a factory, steam plant and dry kiln.

The Fess Rotary Oil Burner, Inc., Boston, is in the local market for an up-to-date plant equipped with modern machinery to the capacity of 300 to 400 machinists.

The Prentiss Wire Co., Holyoke, Mass., is about to start the construction of a three-story addition to its plant.

The Crucible Furnace Supply Co., Inc., Boston, with a capital stock of \$50,000, has been chartered to manufacture metal products and by-products. Leon L. Faux, 89 Temple Street, Whitman, Mass., is president.

The Government has turned over to Kenneth W. and Archibald McNeil Jr., the property of the Liberty Ordnance Co., Bridgeport, Conn., valued at \$2,000,000.

Philadelphia

PHILADELPHIA, Nov. 24.

The Steel Heddle Mfg. Co., 2110 Allegheny Avenue, Philadelphia, has awarded a contract to the William Steele & Sons Co., Sixteenth and Arch streets, for a five-story addition, 94 x 123 ft., to cost \$180,000.

The Marlin-Rockwell Corporation, Philadelphia, has disposed of its plant at Milnor and Devereaux streets, Tacony, on a 5-acre site to E. S. Lewis, Philadelphia, for about \$130,000.

The Marcus Hook Foundry Co., Philadelphia, has been incorporated with a capital stock of \$50,000 by Morrie W. Lefever, Franklin Trust Building; J. H. F. Dixon, Philadelphia; and James F. Powers, Chester.

The Edward G. Budd Mfg. Co., Twenty-fifth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, etc., has awarded a contract to Warren, Moore & Co., Thirteenth and Market streets, for a four-story reinforced-concrete addition, 100 x 300 ft., and one-story building, to cost about \$500,000, including equipment.

A. S. Ashman & Son, 2300 East Tioga Street, Philadelphia, manufacturers of forgings, have filed plans for a one-story addition, 20 x 32 ft., to their forge shop.

The International Boiler Works Co., East Stroudsburg, Pa., has acquired about 40 acres near its works.

The Southwark Foundry & Machine Co., 430 Washington Avenue, Philadelphia, has taken possession of the entire plant of the Quincy Engine Co., Chambersburg, Pa., recently secured under lease. Up to June, 1919, it was operated by the Chambersburg Foundry & Machine Co., for war contracts. The Southwark company will give employment to about 200 men at the plant, for the most part to machine production. It is planned to increase the output at a later date.

The Landis Machine Co., Waynesboro, Pa., manufacturer of machine tools, is reported considering plans for a branch plant. The company has options on a site at Hagerstown, Md., comprising about 10 acres of land, and the Chamber of Commerce, Lancaster, Pa., has also tendered a proposition.

Fire, Nov. 17, destroyed a portion of the plants of the Queen Motor Co. and the Mack Body Co., Lancaster, Pa., with loss estimated at \$75,000.

Baltimore

BALTIMORE, Nov. 24.

The Avon Specialties Mfg. Co., 1508 Madison Avenue, Baltimore, has been incorporated with 100 shares of preferred stock with par value of \$100 and 200 shares of common stock without par value. William L. and Margaret D. Thaxton and Sara T. Carrigan are the incorporators. It will manufacture general automobile equipment and supplies.

J. Dawkazo and C. Feret, rear of 200 South Patterson Park Avenue, Baltimore, will establish a machine and automobile repair shop.

The Bedford Iron & Steel Works Bedford, Va., has been organized with \$30,000 capital stock to manufacture iron products. A foundry is planned and a machine shop may be built. J. J. Scott is president, F. O. Thomas vice-president, and J. W. Garrett secretary and treasurer.

The Shenandoah Milling Co., Riverton Junction, Va., will build a hydroelectric plant.

The Guyan Machine Shops, Logan, W. Va., is interested in quotations on electric hoists, lathes, punches, shears and motors.

The Charlotte Leather Belting Co., Charlotte, N. C., will build a plant for the manufacture of leather belting. One building will be 60 x 100 ft. and two 60 x 300 ft. and will cost about \$100,000. The L. W. Roberts Engineering Co., Candler Building, Atlanta, Ga., is the architect and engineer.

J. C. Steel & Sons, Statesville, N. C., desires quotations on second-hand radial drills.

Prices on locomotive cranes are wanted by the Macon Fuel & Supply Co., Macon, Ga.

The Oldsmar Tractor Co., Oldsmar, Fla., plants to triple its output of tractors. Additional buildings will be constructed. H. J. Keller is general manager.

The American Automatic Train Control Corporation, 1105 American Building, Baltimore, recently incorporated with a capital of \$2,000,000, is having plans prepared for its proposed plant. Calvin W. Hendricks is president.

The Maryland Bolt & Forge Co., Baltimore, has filed plans for a one-story shop on Falls Road.

The Bethlehem Steel Co., Sparrows Point, Md., will build a one-story shop, 60 x 220 ft., to cost about \$25,000. It will be equipped for electric repair work.

The Eastern Shore Can Co., Hurlock, Md., recently incorporated with a capital of \$250,000, has had plans prepared for a two-story plant, 100 x 150 ft., of about 200,000 tin cans daily capacity. S. O. Neal is secretary and treasurer, in charge of purchases. W. M. Wright is president.

The Wright Tool Co., Bowling Green, Ky., has been incorporated with a capital stock of \$60,000 by John Wright, S. Peterson and O. E. Wood.

The Link-Belt Co., 910 South Michigan Avenue, Chicago, manufacturer of conveying machinery, denies the report that it is considering the establishment of a factory at Atlanta, Ga.

Pittsburgh

PITTSBURGH, Nov. 24.

The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, has filed plans for a one-story, brick and steel pipe shop, at Twenty-sixth Street and the Allegheny Valley Railroad, to cost \$70,100.

The Pennsylvania Rubber Co., Jeannette, Pa., manufacturer of automobile tires, has awarded a contract to the Stone & Webster Corporation, Union Arcade, Pittsburgh, for a plant addition to cost about \$1,000,000.

The General Electric Co., Schenectady, N. Y., has acquired property, 120 x 214 ft., at Twenty-third and Wharton streets, Southside, Pittsburgh, to be used for a new building to cost \$100,000. Its former Pittsburgh works on Fifty-seventh Street, were disposed of a few months ago to the Pittsburgh Malleable Iron Co.

The Erie Motor Truck Mfg. Co., Commerce Building, Erie, Pa., has taken bids for a one-story plant, 60 x 350 ft., to cost about \$125,000. It will be located near Wesleyville. J. J. Harvey is general manager.

The Winding Gulf Colliery Co., Winding Gulf, W. Va., is planning the rebuilding of its machine shop, recently destroyed by fire with loss estimated at \$60,000.

Detroit

DETROIT, Nov. 24.

The Commerce Motor Truck Co., Detroit, has acquired two more acres of ground at Mackie and Greene avenues and as soon as the present additions are completed it is expected that still more new manufacturing units will be constructed.

The Almont Mfg. Co., Almont, Mich., has been incorporated with a capital stock of \$25,000. Robert L. Cork has sold his interest in the concern, which was formerly known as the Almont Foundry Co. Charles D. Ferguson is president of the new company.

The Humphrey Co., Kalamazoo, Mich., manufacturer of water heaters, will erect a three-story addition, giving a total floor space of 20,000 sq. ft.

Delay in receiving steel is hampering the erection of the plant of the Union Motor Co., Bay City, Mich., a newly organized concern. Concrete foundations are being laid for a second building, 100 x 500 ft., to duplicate the first one.

The Standard Casting Co., Lansing, Mich., has leased a part of the Thoman Milling Co.'s property on Race Street. The building will be remodeled and additions built for foundry purposes.

The Union Steam Pump Co., Battle Creek, Mich., is spending \$200,000 for additional buildings and equipment. A new unit, 64 x 132 ft., three stories, nearly completed, contains 20,000 sq. ft. of additional machine shop room and 15,000 ft. of storage space. A foundry addition is also being constructed. Upon completion of the building program 100 more employees will be taken on.

Indianapolis

INDIANAPOLIS, Nov. 24.

Amos Whiteley, Sr., president Whiteley Malleable Castings Co., Muncie, Ind., denies a press dispatch that his plant is to be taken over by the Muncie Malleable Foundry Co., composed of Michigan capitalists. He reports, however, that a Lansing corporation has been endeavoring to acquire a factory in Muncie or to establish a malleable iron works there. The Whiteley foundry manufactures steel and malleable iron castings for automobiles and airplanes.

The property of the C. M. Menefee Foundry Co., adjacent to that of S. F. Bowser & Co., Fort Wayne, Ind., has been bought by the latter company for a consideration of \$220,000.

The Jacobs Fuel Savings Co. has been incorporated at Indianapolis with \$10,000 capital stock to manufacture furnaces, ranges and devices for heating. The directors are Frank E. Jacobs, George Stigman and Glenn Riggs.

The Fairfield Mfg. Co., Lafayette, Ind., has been incorporated with \$150,000 capital stock to manufacture motor vehicle parts. The directors are David L. and Edward A. Ross and George C. Kunning.

The Strongcord Tire & Rubber Mfg. Co., Evansville, Ind., has been incorporated with \$250,000 capital stock to manufacture tires. The directors are S. Winfield Stormont, Albert Conen, Frank B. Mesker, DeWitt Chappell and Conrad Haase.

Cincinnati

CINCINNATI, Nov. 24.

An order was received the past week from Belgium for 14 machines. Scattered orders for different machine tools are also coming from France. Little trouble is now experienced in getting shipping permits, except in cases where the machines are for stocking purposes. This works a hardship on makers of small machines which are generally bought from dealers' stocks had not ordered individually. Domestic business in machine tools continues at a steady rate with automobile makers the largest buyers. Jobbing foundries

are all very busy. Malleable foundries in this vicinity have more work than they can handle and it is also difficult to obtain malleable castings from outside plants.

The plant of the Wadsworth Electric Co., Covington, Ky., was damaged by fire Nov. 16, with an estimated loss of \$10,000.

The Seybold Machine Co., Dayton, Ohio, maker of paper cutting and other special machinery, has secured permit for the erection of a building estimated to cost \$85,000.

The Progressive Tool & Engineering Co., Dayton, Ohio, recently incorporated, will equip a plant for designing and building special machinery, tools, dies and fixtures. Edward A. Reese is one of the incorporators.

The S. H. Thompson Mfg. Co., Dayton, operating a jobbing machine shop, has increased its capital stock from \$25,000 to \$60,000.

The United Engineering Co., Dayton, has been incorporated with \$10,000 capital stock by John G. Collison and others and will remove its plant to more commodious quarters at Second and Webb streets. It makes a specialty of tools, dies and fixtures.

The W. B. W. Tool Co., Dayton, has increased its capital stock from \$10,000 to \$50,000.

The Dayton Pneumatic Tool Co., Dayton, has increased its capital stock from \$50,000 to \$250,000, and will build an addition to its plant at an early date.

The Bauer Brothers Co., Springfield, Ohio, will build an addition to its plant, 90 x 350 ft., three stories.

The Columbus Mill & Mine Supply Co., Columbus, Ohio, will soon begin work on a new plant on Marion Road to house its Brown Steel Co. department.

The Champion Coated Paper Co., Hamilton, Ohio, will erect a machine shop addition to its plant.

Chicago

CHICAGO, Nov. 24.

The decline in business recently noted by some dealers has given way to a revival in demand, as general as at any time this year. The sellers' chief difficulty is to secure tools for the desired delivery. Consumers in need of early additions to their equipment no longer concern themselves about the make or size of tool which will best meet their requirements; their efforts are directed at securing any machine which will do the work. Often the road salesman will sell the same stock machines before they are advised that the tools have been disposed of.

Among recent purchases by the Nash Motors Co. for its Milwaukee plant were 19 turret lathes and hand screw machines. The Simmons Co., bedstead manufacturer, Kenosha, Wis., continues to buy equipment and the General Motors Corporation has made some purchases including seven geared-in-head engine lathes, for its new Muncie, Ind., plant. The Inland Steel Co. has bought equipment for its projected rail mill at Indiana Harbor, Ind. Among the tools ordered are rail enders, drills and straighteners, and transfer tables. The Century Electric Co., St. Louis, and the Kansas City Structural Steel Co., Kansas City, have bought three and two turret lathes respectively.

The Chicago, Burlington & Quincy Railroad is expected to take action on its extended list of tools some time this week or next. The American Steel Foundries is in the market for a Gray planer, or equivalent, hack saw, sensitive drill and several upright drills. Vanderbilt University, Nashville, Tenn., is inquiring for an engine lathe, drill press, shaper and a milling machine. The General American Tank Car Corporation, Chicago, wants a number of heavy tools, and the Haskell & Barker Car Co., Michigan City, Ind., is inquiring for a bending roll. The A. O. Smith Co., automobile builder, Milwaukee, is also contemplating the purchase of additional equipment.

The Continental Machine Co., 2002 Clybourn Avenue, Chicago, has been organized by Carl Steen and M. Levey, formerly with the Charles Stecher Co. of that city. The new company has thus far bought about \$7,000 worth of equipment and will engage in the manufacture of special machinery, tools and dies.

The Winchester Repeating Arms Co., New Haven, Conn., is having plans drawn for a target factory to be erected in the Clearing industrial district, Chicago.

The E. H. Wachs Co., manufacturer of engines 1525 Dayton Street, Chicago, has taken bids through an architect for the construction of a two-story addition, 107 x 125 ft., to cost \$32,000.

Mrs. Filshie, 5606 South State Street, Chicago, has awarded contracts for the erection of a one-story foundry, 50 x 100 ft., at 5801-3 South State Street, to cost \$20,000.

The Frank Foundry & Machine Co., West Second Street, Davenport, Iowa, has received bids on a one-story addition, 22 x 35 ft.

The Diamond T Motor Car Co., Chicago, has bought 714,000 sq. ft. adjoining its present plant on the southwest corner of Twenty-sixth Street and Kostner Avenue, and is reported to be contemplating immediate improvement of the property.

The Chicago Electric Mfg. Co., 2817 South Halsted Street, Chicago, has awarded contract for the construction of a two-story plant, 101 x 133 ft., at 2801 South Halsted Street. The estimated cost is \$75,000.

The H. G. Saal Co., die maker, 1810 Montrose Avenue, Chicago, has had plans drawn for a two-story nickel plating factory to cost \$18,000.

The Chicago, Milwaukee & St. Paul Railroad will build a one-story machine shop, 67 x 264 ft., at Sixtieth and Grand avenues, Chicago.

William F. Raffel, manufacturer of disks, 4443 Armitage Avenue, Chicago, has let contracts for a two-story shop, 38 x 120 ft., at 4534 Palmer Avenue, to cost \$15,000.

The Wodack Electric Tool Corporation, 23-27 South Jefferson Street, Chicago, has been organized to manufacture portable electric drills, hammers and grinders. The new company is the successor of the Electric Tool Repair & Maintenance Co., which specialized in repairing and rebuilding electric tools. Oscar P. Wodack, president and treasurer of the new corporation, was until Nov. 1 Chicago district manager for

the James Clark, Jr., Electric Co., with which company he had been associated for 12 years. A. K. Wodack is vice-president, and Albert T. Lochner, secretary and superintendent.

The Archer Jones Electric Co., 2837 South State Street, Chicago, manufacturer of electrical specialties, is having plans prepared for a new one-story plant, 79 x 192 ft., at Calumet Avenue and Twenty-ninth Street, to cost \$60,000.

The American Steel Foundries, McCormick Building, Chicago, manufacturer of castings and other steel products, is having plans prepared for three one-story brick and steel foundry buildings, 180 x 360 ft., 90 x 360 ft. and 104 x 240 ft., to cost about \$350,000, including equipment.

The St. Louis Pressed Steel Co., North Fourth Street, St. Louis, is taking bids for the erection of a new one-story, brick and steel plant at East St. Louis, Ill., 100 x 200 ft., to cost about \$60,000.

A one-story boiler plant to cost about \$150,000 with equipment will be erected by Armour & Co., Union Stock Yards, Chicago, on Forty-fourth Street, near Racine Street.

The Sault Ste. Marie Heating Co., 821 Washington Avenue, Minneapolis, Minn., manufacturer of heating equipment, will build a two-story addition, 40 x 60 ft.

In response to the increasingly large demand for its product, the Doehler Die Casting Co., Court and Ninth streets, Brooklyn, with branch plant at Toledo, Ohio, has just closed the purchase of a 7-acre tract at Chicago, on which it will erect a one-story concrete, steel and brick structure for the manufacture of die castings and bearings. Contract for the building has been let and operations started. The building is to be ready for operation about Jan. 1.

Cleveland

CLEVELAND, NOV. 24.

The demand for single machines and lots up to three or four tools continues very active. No round lot inquiries or orders are reported. While the bulk of the business is coming from manufacturers of automobiles, parts and accessories, there is a good demand from other sources. The call for foundry equipment is heavy. The scarcity of labor has stimulated demand for industrial trucks and tractors, which is very active. Makers of punching and shearing machinery are receiving a good volume of orders from fabricating shops. Wood-working machinery is moving in good volume. The Firestone Steel Products Co., Akron, has placed its order for eight traveling cranes with the Northern Engineering Works, Detroit.

The American Foundry Equipment Co., Cleveland, is inquiring for a second-hand 24 in. engine lathe, horizontal milling machine, radial drill with a 1-in. capacity and 4-ft. extension.

The L & M Axle Co., Cleveland, has acquired a site at East Forty-ninth Street and the Newburgh & South Shore Railroad, on which it will erect a two-story plant, 90 x 500 ft., for the manufacture of automobile axles.

The Cleveland Mixer & Mfg. Co., with office at 5511 Euclid Avenue, Cleveland, has been incorporated with a capital stock of \$10,000 to market mixing machines for the rubber and paint industries. F. A. Pope is president.

The Cleveland Metal Products Co., Cleveland, has purchased the old plant of the National Malleable Castings Co. on Platt Avenue, and will raze a portion of it and erect a structure to cover about one-half of the 3-acre site.

The Automotive Corporation, Toledo, Ohio, has placed contract for the first unit of a plant, 90 x 300 ft. one story, for the manufacture of farm tractors.

The Toledo Smelting & Refining Co., Toledo, Ohio, has been incorporated with a capital stock of \$100,000 by Sam Kasie, president Kasie Iron & Metal Co., and others, and, it is announced, will build a metal refinery.

The Weber Dental Mfg. Co., Canton, is enlarging its plant by the erection of two buildings, 30 x 80 ft., one as an addition to its brass and aluminum foundry and the other for its polishing and plating department.

The Bryan Pattern & Machine Co., Bryan, Ohio, has had plans prepared for new works, 50 x 250 ft., to replace the one recently burned.

The Mount Vernon Foundry & Engineering Co., Mount Vernon, Ohio, has completed plans for a foundry extension, 100 x 188 ft., and a pattern storage building, 82 x 160 ft.

The Trafallete Brothers Mfg. Co., Fostoria, Ohio, maker of tools and dies, has been consolidated with the Fostoria Pressed Steel Co.

The Glamorgan Tire & Rubber Co., Delphos, Ohio, plans the erection of a factory, 300 x 220 ft., including a power plant.

Milwaukee

MILWAUKEE, NOV. 24.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has acquired the plant and business of the Bremer-Waltz Corporation, St. Louis, operating an aluminum rolling mill and kitchen utensil factory, which it will continue as Plant No. 5, under the management of Joseph Topek of Manitowoc and Two Rivers, Wis., and Newark, N. J. Approximately \$2,000,000 is being invested in extensions and new equipment for the Wisconsin factories.

The Menasha Machinery Co., Menasha, Wis., has been chartered to manufacture machinery and appliances. The capital stock is \$50,000 and the incorporators are L. W. Claybourn, G. S. Gaylord and S. H. Clinedinst.

The Mollie Typewriter Co., Oshkosh, Wis., has plans for a three-story brick and concrete addition, 40 x 60 ft., to cost about \$25,000, with machinery. R. D. Wynn is president.

The Felker Bros. Mfg. Co., Marshfield, Wis., maker of steel farm equipment, tanks, culverts, etc., has acquired property adjacent to its plant and next spring will erect a two-story addition, 60 x 120 ft.

The Northern Casket Co., Fond du Lac, Wis., will build a three-story addition, 100 x 100 ft., and will purchase additional wood and metal-working equipment. William Mauthe is president and manager.

The Charles Abresch Co., 399 Fourth Street, Milwaukee, manufacturer of automobile and truck bodies, machine work,

etc., has increased its capital stock from \$200,000 to \$350,000 to enlarge its plant and business. Edmund H. Paul is secretary.

The Flexible Coupling Co., Milwaukee, has been chartered in Wisconsin with a capital stock of \$25,000 to manufacture metal specialties. The incorporators are represented by Henry H. Otjen and James T. Drought, attorneys, 97 Wisconsin Street.

The Briggs & Stratton Co., Milwaukee, manufacturer of automotive equipment, parts, ignition devices and motor wheels, has increased its capital stock from \$250,000 to \$1,700,000. It has an extensive plant enlargement program involving a total expenditure of \$1,000,000. Stephen B. Briggs is president.

The Reliance Motor Truck Co., Appleton, Wis., has deferred until early spring the erection of a four-story addition, 70 x 300 ft., for manufacturing rear axles and increasing its capacity for building motor trucks. The estimated investment will be \$250,000. John M. Balliet is president and general manager.

The James Mfg. Co., Fort Atkinson, Wis., manufacturer of steel barn equipment and stable appliances, has increased its capital stock from \$500,000 to \$1,000,000. It has awarded contracts for a new plant, consisting of a gray iron foundry, machine shop and assembling building, 400 x 600 ft., to cost about \$500,000. W. D. James is general manager.

The Milwaukee Auto Engine & Supply Co., Milwaukee, has let contracts for a one-story brick and steel machine shop addition, 120 x 120 ft., at Thirtieth Street and North Avenue. It manufactures ignition devices and other gas engine parts and specialties. Ben. D. Zimmerman is president.

Stoelting Bros. Co., Kiel, Wis., have engaged Kirchhoff & Rose, architects, Milwaukee, to design a new plant for manufacturing hardware specialties and barn equipment. The estimated cost will be about \$50,000.

The N. B. Gaston & Sons Co., Beloit, Wis., manufacturer of scales, has been acquired by new interests represented by L. Waldo Thompson, president and general manager Gardner Machine Co., Beloit. The business is being reorganized as a corporation with \$200,000 capital stock. It was established in 1842.

The Kemp Smith Mfg. Co., Milwaukee, has increased its capital stock from \$400,000 to \$600,000 to accommodate the growth of its business. Further extensions are contemplated during 1920. Paul E. Thomas is president and general manager.

The American Skein & Foundry Co., Racine, Wis., has broken ground for a new building, 100 x 250 ft., one-story, of brick and steel.

The Stowell Co., South Milwaukee, manufacturer of hardware specialties, has purchased the South plant of the Pelton Steel Co. at Chicago Road and Elliott Place, and will use it as a branch malleable casting shop, employing from 150 to 200 additional workers. Production will begin Jan. 15.

The Auto Truck Service Co., 946 Third Street, Milwaukee, will build a new plant costing \$50,000 for the manufacture of a mechanical hoisting appliance for motor trucks and other motor truck devices. Theodore Hollnagel is president.

The Whitmore Machine & Foundry Co., Menasha, Wis., has started work on the construction of a new machine shop, 60 x 116 ft. A 10-ton electric traveling crane will be installed together with a miscellaneous list of new tools.

The Board of Education, Evansville, Wis., has engaged Perkins, Fellows & Hamilton, 814 Tower Court, Chicago, to prepare plans for a \$100,000 high school, with manual training department.

The J. L. Clark Mfg. Co., Oshkosh, Wis., has increased its capital stock from \$150,000 to \$200,000. It has completed its reorganization from a carriage manufacturer to a producer of automobile bodies, motor truck cabs, etc. W. E. Muir is secretary and treasurer.

The Felker Mfg. Co., Marshfield, Wis., has plans for a one-story machine shop addition, 75 x 150 ft.

The Tomah Rubber Works, Tomah, Wis., a \$75,000 corporation, will build a factory to manufacture special inner tubes for pneumatic tires. Leo Hofmeister, Milwaukee, is prime mover in the enterprise.

The Lloyd Mfg. Co., Menominee, Mich., manufacturer of machinery for weaving reed baskets, baby carriages, etc., has purchased the plant of the former Automatic Welding Co. at Menominee.

The Nordberg Mfg. Co., Milwaukee, has awarded the general contract to the Dahlman Construction Co., Majestic Building, for erecting a new machine shop addition, one-story, 100 x 120 ft. Additional tools and other equipment are being purchased.

Canada

TORONTO, NOV. 24.

The St. Lawrence Welding Co., Montreal, has acquired the adjoining property for the manufacture of tanks. The new shop will take care of work up to 1½ in. Several machine units have been ordered and negotiations for others are in progress. The machine shop has been enlarged and the company is continually adding to its general equipment. R. M. Rook, for the past five years associated with the Metal & Thermit Corporation of New York, has been appointed general foreman. T. W. Rogers has also joined the company as sales manager.

The St. Lawrence Iron Foundry, Montreal, is disposing of its munitions equipment and anticipates returning to foundry work early in 1920.

Peacock Brothers, engineers, 285 Beaver Hall Hill, Montreal, will shortly remove their offices to 175 Delorimer Avenue, their manufacturing plant, operating as the Clyde Engineering Co. Considerable expansion has taken place recently and further additions are contemplated.

The Oil Engine Works of Canada, 29 Prince Street, Montreal, will shortly move its plant to Ilerville, Que., where it will occupy a portion of the Rapid Tool & Machine Co. plant. Its machine work on the 6 and 8-hp. Hvid oil engines, formerly contracted for, will be largely done at its new assembly plant. M. L. G. Vincent is managing director.

The Dominion Bridge Co., Montreal, will utilize the plant of the St. Lawrence Bridge Co., at Rockfield, for the manufacture of pulp and paper machines, a new undertaking. It also intends to build a gray-iron foundry for this line and turbo equipment.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5c.; Denver, 99c.; Omaha, 59c.; minimum carload, 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload, 40,000 lb.; and \$1.25, minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and Zees, structural sizes, 2.45c.

Wire Products

Wire nails, \$3.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50 and shorter than 1 in., \$2.00. Bright basic wire \$3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.10; galvanized wire, \$3.80; galvanized barbed wire and fence staples, \$3.50; cement-coated nails, \$3.10 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 1/2 per cent off list for carload lots, 59 1/2 per cent for 1000-rod lots, and 58 1/2 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets, \$4.10 base
Large boiler rivets, \$4.20
Small rivets, 1/4 in., 5/16 in. diameter, 50 per cent off list a"
Small rivets, 3/8 in., 7/16 in. and 7/8 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, 3/8 in. x 4 in.
Smaller and shorter, rolled threads, 50 and 10 per cent off list
Cut threads, 50 per cent off list
Larger and longer sizes, 40 and 5 per cent off list
Machine bolts, c.p.c. and t. nuts, 3/8 in. x 4 in.:
Smaller and shorter, w40 and 5 per cent off list
Larger and longer, 35 and 5 per cent off list
Carriage bolts, 3/8 in. x 6 in.:
Smaller and shorter, rolled threads, 45 and 5 per cent off list
Cut threads, 40 and 5 per cent off list
Larger and longer sizes, 30 and 10 per cent off list
Lag bolts, 50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3, 50 per cent off list
Plow bolts, Nos. 4 to 10, 50 plus 20 per cent off list
Hot pressed nuts, sq. blank, 2.50c. per lb. off list
Hot pressed nuts, hex. blank, 2.50c. per lb. off list
Hot pressed nuts, sq. tapped, 2.25c. per lb. off list
Hot pressed nuts, hex. tapped, 2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank, 2.50c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped, 2.25c. per lb. off list
Semi-finished hex. nuts:
3/8 in. and larger, .65 per cent off list
9/16 in. and smaller, .70 and 10 per cent off list
Stove bolts in packages, .75-10 per cent off list
Stove bolts in bulk, .75-10-21 1/2 per cent off list
Tire bolts, .660-10 per cent off list

The above discounts are from Nov. 1, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$55; chain rods, \$60; screw, rivet and bolt rods and other rods of that character, \$60. Prices on high carbon rods are irregular. They range from \$65 to \$85, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 1/2 in., 9/16 in. and larger, \$3.35 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 3/4 in., 7/16 in. and smaller, \$3.85 to \$4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, \$4.35 to \$4.50 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Bolt and barer spikes, \$3.85 to \$4 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.20; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.75c. from mill. Bar iron, 3.10c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld			
Steel		Iron	
Inches	Black. Galv.	Inches	Black Galv.
1/4, 1/2 and 3/4	50 1/2 24	1/4 and 1/2	29 1/2 24
1/2	54 1/2 40	1/2	30 1/2 34
3/4 to 3	57 1/2 44	1/2 to 1 1/2	34 1/2 16 1/2
		3/4 to 1 1/2	30 23 1/2
Lap Weld			
2	50 1/2 38	1 1/2	24 1/2 9 1/2
2 1/2 to 6	53 1/2 41	1 1/2	31 1/2 17 1/2
7 to 12	50 1/2 37	2	32 1/2 18 1/2
13 and 14	41	2 1/2 to 6	34 1/2 21 1/2
15	38 1/2	7 to 12	31 1/2 18 1/2
Butt Weld, extra strong, plain ends			
1/4, 1/2 and 3/4	46 1/2 29	1/4, 1/2 and 3/4	28 1/2 11 1/2
1/2	51 1/2 39	1/2	33 1/2 20 1/2
3/4 to 1 1/2	55 1/2 43	3/4 to 1 1/2	39 1/2 24 1/2
2 to 3	56 1/2 44		
Lap Weld, extra strong, plain ends			
2 1/2 to 4	48 1/2 37	1 1/2	31 1/2 17 1/2
4 1/2 to 6	51 1/2 40	2	33 1/2 20 1/2
7 to 8	50 1/2 39	2 1/2 to 4	35 23 1/2
9 to 12	46 1/2 33	4 1/2 to 6	34 1/2 22 1/2
13 to 15	41 1/2 28	7 to 8	26 1/2 14
1 1/2	25 1/2 10 1/2	9 to 12	21 1/2 9 1/2

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3 1/2 to 4 1/2 in. 40 1/2	3 to 3 1/4 in. 1 1/2
2 1/2 to 3 1/4 30 1/2	2 1/2 to 2 3/4 in. 1
2 1/2 in. 24	2 to 2 1/4 in. 10
1 3/4 to 2 in. 19 1/2	1 3/4 to 1 7/8 in. 20
3/4 to 4 1/2 in. 16	

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in. \$327	1 1/4 in. \$207
1 1/4 in. 267	2 to 2 1/4 in. 177
1 3/4 in. 257	2 1/4 to 3 1/4 in. 167
1 1/2 in. 207	4 in. 187
	4 1/2 to 5 in. 207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed Bessemer	Cents per lb.
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 and 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55

Galvanized, Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20

Tin-Mill Black Plate Bessemer

Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30 1/2 and 31	4.45

The Chicago Technical Conventions

(Continued from page 1062)

rect temperature, this solid solution is retained at atmospheric temperature. The trend of American practice for hardening high speed steel is towards the following:

Slowly and carefully preheat the tool to a temperature of approximately 1500 deg. Fahr., taking care to prevent the formation of excessive scale.

Transfer to a furnace, the temperature of which is approximately 2250 to 2400 deg. Fahr. and allow it to remain in the furnace until the tool is heated uniformly to the above temperature.

Cool rapidly in oil, dry air blast or lead bath.

Draw back to a temperature to meet the physical requirements of the tool and allow it to cool in the air. It has been found desirable to draw back to 1100 deg. Fahr.

C. U. Scott, president C. U. Scott & Son, consulting engineers, Davenport, Iowa, explained in detail successful methods he has employed in heat treating drop hammer dies, in a paper, "Heat Treatment of Drop Hammer Dies." He has found that heated water or steam pressure need be applied to a die no longer than 50 or 60 seconds, as by that time it is through hardening. Following hardening the die is set in a tank with water deep enough to fill the impression and reach about $\frac{1}{2}$ in. above it, except in the case of deep impressions, which need not be entirely filled with water. To prevent extreme hardness at the corners of the impression, they are swabbed with a wet cloth before the hardening process is begun. To temper a die, it is covered with a smooth piece of iron and returned to the furnace where it is drawn to a straw or blue color.

The sessions on other days were replete with papers representing exhaustive research in different branches of heat treating. C. A. Brewster, American Steel Foundries, Chicago, described his experience in annealing large sections of cast nickel steel and similar sections of plain carbon steel. The results, he pointed out, depended first on the character of the steel and secondly, on the temperature applied and the time of heat application. He showed the comparative results of the same treatment of the two steels in a number of lantern slides.

Robert M. Taylor, works engineer, American Tool Works, Cincinnati, in a paper on "Heat Treatment of Steel for Machine Parts," explained the S. A. E. specifications for tool steel, adopted by automobile engineers, under which a system of numbers indicates the character of the tool steel and the kind of heat treatment it has undergone. The first numeral of a given number, for instance, indicates the general class of steel; the second numeral, the percentage of the predominant element; the third, the percentage of carbon, etc. He mentioned nine tool steels which are suitable for all common uses in the machine shops of tool manufacturers.

Heat Treating Steel Castings

Alvin N. Conarroe, chemist and metallurgist, National Malleable Castings Co., Melrose Park, Ill., read a paper, illustrated by lantern slides, on the "Heat Treatment of Cast Steel." He demonstrated that steel castings can be refined by heat treatment to possess physical characteristics comparable to forgings, but require longer and more drastic treatment. Defects inherent to cast steel, he said, are more pronounced in castings due to the lack of mechanical working. Foreign inclusions have a marked influence on the strength of the steel casting, due to their segregating influence upon ferrite. The rate of cooling of castings, after pouring, exerts an influence on the size of the crystalline grains and especially on material which has a tendency to the formation of dendrites. The latter can be eliminated by heat treatment, but require drastic treatment. Shrinkage, he said, should be eliminated in the furnace and foundry practice. Welded castings should be reannealed to remove strains and properly refine the grain.

Herbert S. Wilson, metallurgist Collins Safety Razor Co., Chicago, read a paper on the "Phenomena of Annealing." His discussion was confined to the annealing of mechanically worked material. In annealing such material, he said, it is not necessary to heat above a point just below the critical point, in other words, to the point of relaxation where the

strains within the crystalline structure are relieved. If that point is exceeded thermochemical action sets in, transforming the crystalline structure of the steel and thereby affecting its hardness.

In the Wednesday afternoon session, Sept. 24, John J. Jones, Pressed Steel Car Co., Pittsburgh, read a paper on the "Heat Treatment of Tools for Alternate Contact." He recounted in detail the methods and routine followed in heat treating at the plant with which he is connected. He asserted that it is highly important that heat treaters know the analysis of the steel they are using, and censured makers who withhold this information and merely send instructions for treating which are often incomplete and misleading. He was also of the opinion that steel treating would be very much simplified if pyrometers could be devised which would indicate when the point of recalcination has been reached by showing a red light or ringing a bell, or registering in some other distinct manner. Such an improvement, he said, would be particularly helpful at the present time when there are so many inexperienced men in the hardening departments.

That some progress has been made in the direction suggested by Mr. Jones, became evident when George W. Tall, Jr., Leeds & Northrup Co., Philadelphia, read a paper on the "Hump Method of Heat Treatment." In brief, this method calls for the treatment of tools in an electric furnace equipped with an electric heat recording mechanism which indicates the time of heating and the rise in temperature on revolving cross-section paper. When the steady incline of the recorded curve shows a hump, the operator knows that the point of recalcination has been reached. By experiment the proper rate of heating to obtain the best results can be determined. This method is particularly well adapted to repetitive practice, i. e. the heat treatment of a large number of tools of the same kind. By finding appropriate rate of heating the variation in volume between untreated and treated tool can be held to 0.00025 inch.

In the Tuesday evening session, Sept. 23, H. B. Knowlton, metallurgist Case Hardening Service Co., Cleveland, discussed "Selection of a Carburizing Material." He described the various types of material on the market, comparing the pill with the granule and the coated granule with the mimpregnated granule.

H. H. Harris, Swedish Crucible Steel Co., Detroit, read a paper on "Controlling the Cost of Pots and Boxes." He set forth the relative merits of cast-iron, cast steel, special cast steel, alloy steel and special alloy boxes and pots.

Cyril J. Atkinson, consulting metallurgist, Milwaukee, Wis., read a paper on the "Metallography of Steel," illustrated by 50 lantern slides. T. G. Selleck, Alfred O. Blaich Co., Chicago, discussed "The Cause of Failures in Case Hardening." He stated that there is no perfect carbonizer and no perfect process, although sometimes an approximation of perfect results is obtained through the application of imperfect fundamentals.

During the sessions of the convention over 100 additional members were enrolled and applications for the establishment of new local chapters at various cities.

Election of Officers

The first permanent officers of the Association were elected as follows:

President, T. E. Barker, production manager, Miehle Press & Mfg. Co., Chicago; first vice-president, E. J. Janitzky, metallurgical engineer, Illinois Steel Co., Chicago; second vice-president, D. K. Bullens, consulting metallurgist, Cann & Saul, Royersford, Pa.; secretary, Arthur G. Henry, metallurgist, Illinois Tool Works, Chicago; treasurer, A. F. Boissoneau, assistant manager, A. Finkl & Sons Co., Chicago. Directors: H. G. Weidenthal, vice-president, Jas. H. Herron Co., Cleveland, Ohio; A. F. MacFarland, metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa.; J. Fletcher Harper, assistant superintendent, forge shop, Allis-Chalmers Co., Milwaukee, Wis., and J. C. Pollack, secretary, Pollack Steel Co., Cincinnati, Ohio.

Absorption of Detroit Steel Treaters

While not publicly announced it is understood that the probable result of present negotiations will be that

the Detroit Steel Treathers' Society, Detroit, Mich., will probably become an integral part of the American Steel Treathers' Society. The Detroit society was organized about three years ago, but has been largely a local aggregation of metallurgists of Detroit and a few other industrial centers.

American Electrochemical Society

Very few, if any, sessions of the Electrochemical Society, which held its thirty-sixth general meeting at this time, were held independently but were in most cases simultaneous sessions with the mining and metallurgical engineers at the Congress Hotel or with the chemical sessions at the chemical exposition at the Coliseum.

Symposium on Pyrometry

The most impressive and important gathering was that of Thursday, Sept. 25, when an all-day session was devoted to a symposium on pyrometry. The attendance was large, numbering nearly 250, and the program a pretentious one. There were 53 different papers on the schedule, of which 35 were presented by the authors. The papers and the discussion covered every phase of this important subject. The session, while dealing largely with an electrochemical, or at least electrical subject, was a simultaneous one of electrochemists and mining and metallurgical engineers and was arranged as a co-operative meeting between the National Research Council and the U. S. Bureau of Standards. Not only were the different kinds of pyrometers discussed as to their state of development and application, but the use of these various instruments in the glass industry, the ceramic industry, the cement industry and other branches was dwelt upon. The session was presided over by Dr. K. Burgess, United States Bureau of Standards, Washington, and many of the papers were presented by various members of the technical staff of the Bureau.

An important meeting of the electrochemists was that of Wednesday afternoon, Sept. 24, at the Coliseum, in the form of a joint technical session with the mining engineers, the topic being ferrous and non-ferrous metallurgy.

"A Square Deal for the Electric Furnace," by H. G. Weidenthal, James H. Herron Co., Cleveland, was the most important paper. It may be characterized as a polemic defending the electric furnace for steelmaking against the prejudices of the trade. The user is urged to acquaint himself thoroughly with electric furnace practice and furnish the best that can be produced by the electric furnace. By so doing he will do justice to himself and his business and at the same time give the electric furnace a square deal.

F. A. J. FitzGerald, FitzGerald Laboratories, Niagara Falls, N. Y., in a paper, "Radiant Resistor Furnace," described an apparatus for the distillation of low grade and scrap zinc. It was stated that the best results were obtained with a current of approximately 845 A at 65 volts or 55 kw. With this power the output was about 50 kg. of refined zinc per hour.

An electrically heated oven for baking japan on various parts of typewriters was described by A. M. Clark, industrial heating department, General Electric Co., Schenectady, N. Y., in a paper, "Electric Heat in the Typewriter Industry." By comparative tables the author shows the better economy and large capacity of the electrically heated oven, compared with gas or oil heated ovens.

An interesting electric furnace for experimental work was described by Mr. FitzGerald and Grant C. Moyer, both of the FitzGerald Laboratories, Niagara Falls, N. Y.

American Electric Furnace Association

The American Electric Furnace Association, which met at the Congress Hotel on Monday, Sept. 22, brought together some of the foremost electric steel men of the United States and Canada. The purpose of the association is to bring out the superior quality of products made in the electric furnace, and an extremely interesting discussion of this subject took place.

The association is the outgrowth of a meeting held

in New York last April, which was attended by electric furnace men and at which time it was recognized that there was great need for closer co-operation between the electric furnace designer, the power engineer and those who operate electric furnaces. The association is not an off-shoot of any other society and its policy will be to co-operate with all the other societies and associations who are interested in electric furnaces or their products.

There were about 60 present and H. G. Weidenthal read an interesting paper in which he pointed out the great demand for better steel in the automotive industry and indicated the increased demand for electric steel in that field. He recited the great need for greater factors of safety in the vital parts of automobiles, trucks and tractors and showed that the electric furnace would be called upon to supply steel of the proper quality.

In response to a demand for data on electric furnace products the association has gathered together some information in regard to the high quality of electric steel, which it has issued in the form of a booklet. Those who attended the meeting commended this effort highly. In addition to data on quality the booklet also contains some statistics on the growth of electric steel production.

Among those who attended the meeting were L. E. Howard, S'monds Mfg. Co.; L. M. Reed, Haynes Stellite Co.; A. C. Jones, Electric Steel Co., Chicago; W. F. Graham, Spicer Mfg. Corporation; E. S. Gardner, Illinois Steel Co.; Edward T. Moore, Halcomb Steel Co.; F. W. Chapman, Standard Steel Castings Co.; J. M. Blake, American Manganese Steel Co.; A. Trevor Jones, American Steel Foundries; A. H. Miller, Midvale Steel & Ordnance Co.; A. U. Tirbutt, Manitoba Steel Foundries, Ltd.; Mr. Starr, Pettibone Mulliken Co., Chicago, and many others interested in the electric steel industry.

A permanent organization was effected and the following officers elected:

President, Acheson Smith; vice-presidents, C. H. Booth and W. E. Moore; secretary, C. G. Schluenderberg; treasurer, F. J. Ryan.

The executive address of the association is Post Office Box 616, Niagara Falls, N. Y.

The next meeting will probably be held next Spring in conjunction with some of the national technical societies, and it is probable that a symposium on the subject of power for the electric furnace will be the principal feature of the meeting. This will give an opportunity for the power engineer and the electric steel men and others operating electric furnaces to thoroughly discuss the power service problem of the electric furnace.

Although the present meeting was largely devoted to electric steel, it is the intention of the association to take up the subject of non-ferrous metals and other materials made in the electric furnace.

The Banquets

Both the mining and metallurgical engineers and the steel treathers held banquets, the electrochemists uniting with the former. At the banquet on Wednesday evening of the American Institute of Mining and Metallurgical Engineers at the Congress Hotel, Charles M. Schwab, chairman Bethlehem Steel Corporation, was the chief speaker. "When we get back to the practice of giving an honest day's work for an honest day's pay, all theoretical questions as to the high cost of living will automatically disappear," said Mr. Schwab. Theodore W. Robinson, vice-president Illinois Steel Co., characterized the steel strike as "the fight of a militant minority to try to force class distinction upon a peaceful majority."

The banquet of the American Steel Treathers' Society was held Thursday evening at the Morrison Hotel, and was attended by over 300 guests. Dr. Henry M. Howe, dean of American metallurgists and an honorary member of the society, was the guest of the evening and the chief speaker. Prof. Joseph W. Richards, secretary American Electrochemical Society, was the other prominent guest and speaker. Both called attention to the phenomenal growth of this new organization and the importance of its work.

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